FINAL
EXPANDED SITE INSPECTION
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE
COEUR D'ALENE, IDAHO
VOLUME 1 - REPORT

ARCS Region 10

Contract NO. 68-W9-0020

Work Assignment No. 20-26-OJZZ

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Final
Expanded Site Inspection
Coeur d'Alene Groundwater Contamination Site
Coeur d'Alene, Idaho

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1. INTRODUCTION

Ecology and Environment, Inc., (E & E) has been assigned by the United States Environmental Protection Agency (EPA) to provide technical support for the completion of an expanded site inspection (ESI) at the Coeur d'Alene groundwater contamination site (CDA) in the City of Coeur d'Alene, Idaho. E & E activities were conducted under work assignment number 20-26-OJZZ, issued under EPA Region 10 Alternative Remedial Contracting Strategy (ARCS) contract number 68-WP-0020.

ESI activities conducted by E & E addressed work elements listed in EPA's scope of work (SOW) dated January 31, 1994. The specific goals for the CDA ESI identified by EPA in the SOW are presented below:

- To provide EPA with adequate information to determine if the site is eligible for placement on the National Priorities List (NPL) based on the Hazard Ranking System (HRS) and, if so, support EPA's case for listing the site;
- To alert EPA to immediate threats to public health or the environment and assess whether there are early action/removal activities that are appropriate for the site;
- To provide EPA with more information on site characteristics, contaminant sources and distribution, and migration pathways to assist in scoping the remedial investigation/feasibility study; and
- To prepare information on the site so that it can be transferred to the remedial program in an organized and useful way.

The primary objectives of the CDA ESI were presented in the Field Operations Work Plan (FOWP) for the first phase of field activities (E & E 1994b), and the FOWP/Quality

Assurance Project Plan (QAPjP) for the second and third phases of field activities (E & E 1994c). These objectives include the following:

- Determine whether the potential sources identified in Section 2.2 of this document are, in fact, sources of the trichloroethylene (TCE) contamination observed in downgradient wells;
- Determine whether other unidentified wells within the site boundary contain TCE contamination to better define the TCE plume and to identify contamination that may be a potential threat to public health;
- Further investigate local hydrology and aquifer characteristics that may be affecting the contaminant plume. This may aid in determining the source(s) of the contamination and identifying the plume direction to protect other water resources; and
- Collect data and create a data management system that will organize all site data and augment existing Geographic Information System (GIS) information. All information collected during the ESI field activities are available for input into the current GIS for the CDA.

The focus of the ESI was to investigate potential sources of TCE and its breakdown products and their impact on groundwater resources. Section 2 presents description of the site background; a discussion of TCE, its breakdown products, and related compounds. Section 3 describes the field activities conducted and analytical protocol for the ESI. Section 4 presents a discussion of the project analytical quality assurance and quality control measures for the ESI. Section 5 presents a summary of historical data and data collected during the ESI. Section 6 describes the geological and hydrogeological setting and analytical data gathered during the ESI. Section 7 provides a brief summary of the findings of the ESI.

Although TCE was the focus of the ESI, the data generated during the investigation indicate that there are other contaminants in the subsurface, including other chlorinated hydrocarbons and aromatic hydrocarbons.

2. SITE BACKGROUND

This section presents background information of the Coeur d'Alene groundwater contamination site, including a brief discussion of its geographic setting, a summary of the investigatory history, and a description of the contaminants of concern for the ESI.

2.1 SITE LOCATION AND SETTING

The Coeur d'Alene groundwater contamination site (CDA) consists of approximately 23 square miles in the northern portion of the City of Coeur d'Alene, Idaho. The CDA study area, as defined in the SOW, is shown in Figure 2-1. CDA is positioned between Hayden Lake to the northeast and Coeur d'Alene Lake to the south. It is believed to be in a recharge area of the Spokane Valley-Rathdrum Prairie Aquifer, which is a sole-source aquifer for Spokane, Washington, and Post Falls and Coeur d'Alene, Idaho (E & E 1994a).

Coeur d'Alene is characterized by a dry continental climate with an average annual rainfall of 26.03 inches and a mean annual lake evaporation rate of 38 inches. The average annual temperature is 47.5°F (E & E 1993).

2.2 SITE AND WASTE CHARACTERISTICS

2.2.1 Investigatory History

In the fall of 1989, the State of Idaho adopted new regulations that established maximum contaminant levels (MCLs) for certain volatile organic compounds (VOCs) in drinking water. These regulations also established monitoring and reporting requirements for all community water systems, including requirements for quarterly sampling for VOC analyses of water system supply wells (Idaho Department of Environmental Quality [IDEQ] 1990a).

Accordingly, in March 1990, the Sunrise Terrace Water Association, serving a private development with 55 connections, asked IDEQ to collect a water sample from its system for VOC analyses. The Sunrise Terrace Water Association system consists of two adjacent wells, designated as the north and south wells, and a storage reservoir. The two wells are screened at a similar depth interval; from 261 to 296 feet below ground surface (BGS) for the north well, and from 285 to 300 feet BGS for the south well. IDEQ collected the sample from the water distribution system downstream of the reservoir. Analytical results indicated TCE at 22.8 micrograms per liter (μg/L), above the MCL of 5 μg/L for TCE. A verification/check sample collected the following month indicated TCE at 20.0 μg/L (IDEQ 1990b).

In April 1990, additional samples were collected at the wellhead of each of the two supply wells. Analytical results indicated TCE concentrations of 26.5 μg/L in the north well and 19.8 μg/L in the south well. Subsequent sampling later that month indicated similar results. In 1991, the Sunrise Terrace Water Association began receiving water from the City of Coeur d'Alene (E & E 1993).

In July 1992, at the request of IDEQ, the City of Coeur d'Alene well was added to the ongoing Rathdrum Prairie monitoring program and was sampled by the Panhandle Health District (PHD) for VOC analysis. This well is located approximately 800 feet west of the Sunrise Terrace well system and is screened from 290 to 340 feet BGS. Although the screened interval of the Hanley well is deeper than those of the Sunrise Terrace wells, its surface elevation is proportionately higher, thus placing its screen at an elevation comparable to those of the Sunrise Terrace wells. TCE was detected in the June 1992 sample at 3.17 μg/L (IDEQ 1992). Subsequent quarterly sampling by the City of Coeur d'Alene has indicated TCE at similar concentrations. A sample collected on May 2, 1995 contained TCE at a concentration of 5.22 μg/L, above the MCL of 5 μg/L. Based upon these sample results, the Hanley well will be sampled for VOC analysis on a biweekly basis. The Hanley well is currently in operation. The highest pumping rates, which generally correspond with the highest TCE concentrations in this well, occur in the summer months. In July 1994, it was pumping approximately 75% of the time at a rate of 3,500 gallons per minute (gpm) (Markley 1994).

A review of the EPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) site file, a search of EPA's STORET database, and

a review of records from the IDEQ and PHD indicate that TCE has been detected in ten wells sampled in the Coeur d'Alene area prior to the present investigation. **It should be noted, however, that the reported analytical results for samples collected prior to 1989 are of questionable reliability due to inadequate quality assurance procedures adhered to at the IDEQ analytical laboratory prior to 1989 (Painter 1995).** Sample results for these wells are presented in Table 2-1 and Figure 2-2. The Coeur d'Alene Airport well and the LA Aluminum well are located north of the northern boundary of the study area, near the airport, approximately 2.5 miles north of the Sunrise Terrace wells. All of the wells listed in Table 2-1 have been sampled periodically up to the present. Only the Coeur d'Alene Hanley well, the Sunrise Terrace well system, and the H & D Trailer Park well have exhibited TCE contamination since 1989. Several of the above wells were sampled during the present ESI, and are discussed below.

In 1990, IDEQ initiated an investigation to identify potential TCE sources in the area of the Sunrise Terrace Water System. One site previously discovered by EPA under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (E & E 1984) was identified as a potential source. The site, Deming Industries, is located approximately 2 miles southeast and hydraulically upgradient of the Sunrise Terrace wells. Former employees of Deming Industries have alleged that TCE-contaminated waste was released to their on-site septic/dry well system and to the ground (IDEQ 1990b).

In 1991, EPA tasked the E & E Field Investigation Team (FIT) (Contract Number 68-01-7347) to identify and conduct a preliminary investigation of potential sources of TCE in the CDA area. This investigation resulted in the identification of 26 potential sources of TCE, including Deming Industries (E & E 1991). Table 2-2 lists the sites identified in this investigation. As noted in Table 2-2, several of the sites were visited by the FIT and brief reports were generated outlining the potential of the site in question to have contributed to groundwater TCE contamination. Based on this information, several sites (GTE, C & S Transmission, Kootenai County Landfill on Ramsey Road, the Idaho Department of Transportation (IDOT) facility on Ramsey Road, and the former IDOT facility on Government Way) were revisited by the URS Consultants Field Investigation Team (FIT) in 1992 to gather additional information and document site conditions (EPA 1994).

In November 1993, E & E's Technical Assistance Team performed sampling at two of the previously identified potential TCE sources (the former Asphalt Batch Plant area and vicinity and Advanced Input Devices) for the EPA (contract number 68-WO-0037). Results of this investigation are included in the Field Activities and Analytical Protocol section of this ESI Report.

Based on these preliminary investigations and information acquired during the ESI, seven potential source areas were chosen for further investigation and sampling during the ESI. These potential source areas are: Deming Industries; Advanced Input Devices; the former IDOT Maintenance facility on Government Way; the current IDOT facility on Ramsey Road; the Kootenai County Ramsey Road landfill; Interstate Concrete and Asphalt; and the Park Avenue/Dalton Avenue area (includes the Former Asphalt Batch Plant and GTE).

2.2.2 Contaminants of Concern

The contaminants of concern for the CDA ESI include TCE and its degradation products: 1,1-dichloroethene (1,1-DCE); cis-1,2-dichloroethene (cis-1,2-DCE); and trans-1,2-dichloroethene (trans-1,2-DCE). In addition to the above compounds, 1,1,2,2-tetrachloroethene (PCE) and 1,1,2,2-tetrachloroethane (PCA) were targeted because they can break down into TCE. Figure 2-3 illustrates the conceptual transformation of TCE, PCE, PCA, and other chlorinated aliphatic hydrocarbons (CAHs).

TCE has been widely used in the past by industry as a cleaner/degreaser. Industrial processes that may have generated TCE waste include metal finishing, paint and ink formulation, dry cleaning, fabrication of electrical/electronic components, and rubber processing (Tomes 1994). Both PCE and PCA, like TCE, have been used in industry to degrease metals. PCE is also widely used for dry cleaning. PCA is commonly used in the manufacture of paints, varnish, and lacquer (Tomes 1994). TCE and its degradation products have low adsorption coefficients indicating ready transport through soil and a low potential to adsorb to sediments (Tomes 1994). These compounds have relatively high vapor pressure which indicates rapid evaporation from near-surface soil and other surfaces (Tomes 1994).

Transport of TCE through the unsaturated zone of the subsurface likely occurs rapidly, based on the low adsorption potential and the predominantly coarse nature of the subsurface

soils in the study area, although vertical migration may be impeded or diverted locally by the presence of clay bearing intervals. Soil gas screening using a Geoprobe™ was chosen to identify potential sources of TCE. Soil gas screening was selected based on the relative ease of sample collection and field analysis and the relatively high vapor pressure of these compounds. Soil samples were also collected, and, in some cases proved to be a more reliable indicator of the presence of TCE at the potential source areas investigated.

Table 2-1

**HISTORIC TCE CONCENTRATIONS IN COEUR D'ALENE WELLS
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO**

Well	TCE Concentration (µg/L)	Date Detected
Sunrise Terrace Well system	up to 26.5	1990, 1991
Coeur d'Alene Hanley well	up to 4.84	1992 to present
H & D Trailer Park	0.68	April 1994
Coeur d'Alene Linden well	2.0	1989
Coeur d'Alene Locust well	0.6	1989
Turrell well	1.0* 2.0	1985 1989
U.S. Forest Service well	0.4*	1985
Dalton Garden well #1	0.5*	1985
Coeur d'Alene Airport well	0.4*	1985
LA Aluminum well	1.0* 2.0*	1985

µg/L = Micrograms per liter of water

* Note: Analytical results for samples collected prior to 1989 are of questionable reliability due to inadequate quality assurance procedures adhered to at the IDEQ laboratory prior to 1989. See text.

Table 2-2

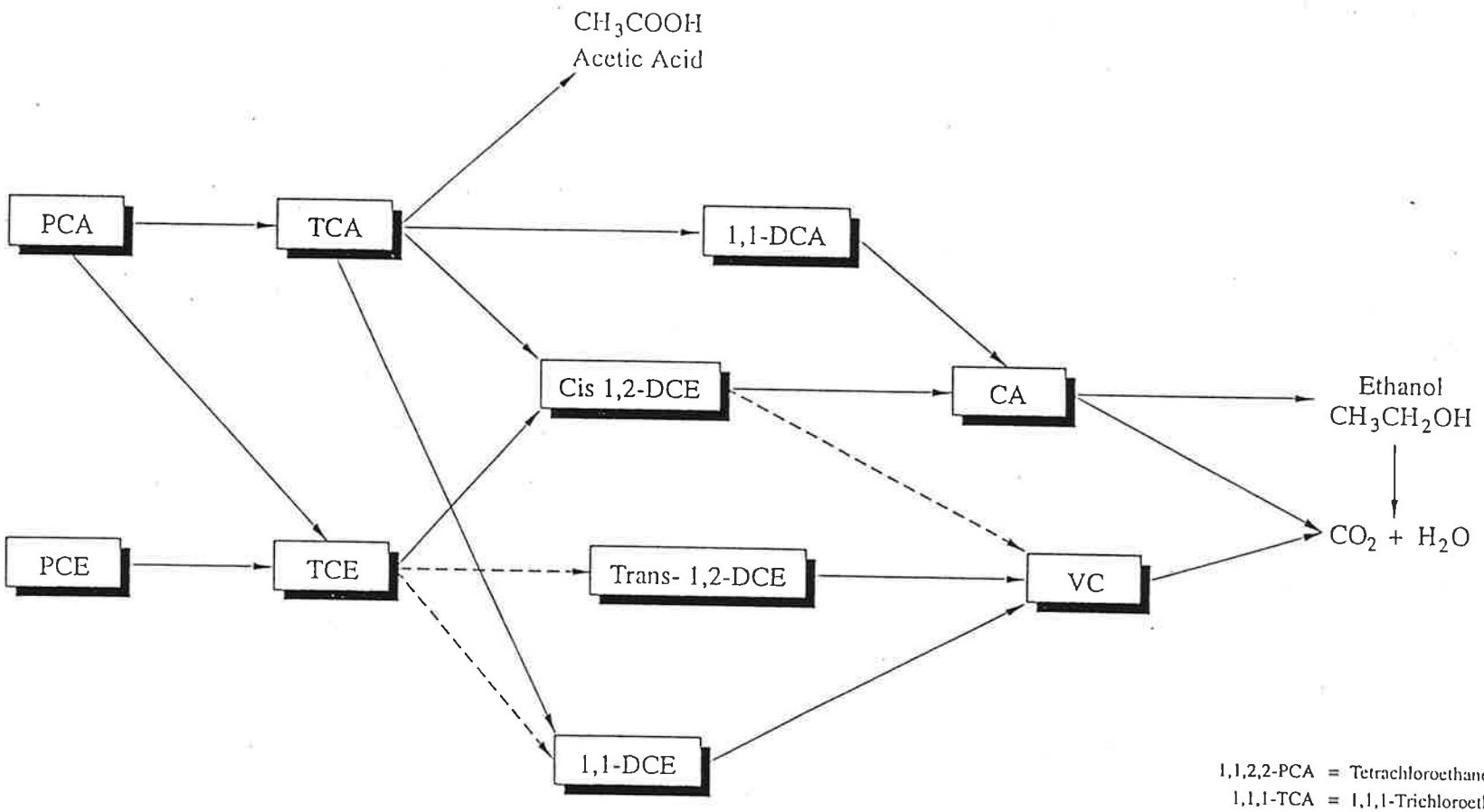
POTENTIAL SOURCES OF GROUNDWATER TCE CONTAMINATION
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO

No.	Site Name/Address	Comments
1.	Deming Industries, Inc. 2945 Government Way Coeur d'Alene, Idaho 83814	Known to have illegally disposed TCE on site; EPA investigated (CERCLA). Site visit and report, May 1991.
2.	Advanced Input Devices (AID) W. 250 AID Drive Coeur d'Alene, Idaho 83814	Makes computer keyboards; RCRA file indicates AID has been cited in violation of many regulations regarding hazardous waste; AID has filed with EPA as a generator of spent halogenated solvents which includes TCE. Site visit and report, May 1991.
3.	GTE 450 W. Park, Box 1058 Coeur d'Alene, Idaho 83814	Located near Sunrise Terrace; listed with EPA as an ignitable waste generator; TCE is known to be used in electrical component manufacturing. Site visit and report, May 1991.
4.	Property owned by: T & S Investments P.O. Box 1828 Coeur d'Alene, Idaho 83814 Site location: 563 W. Park Avenue Coeur d'Alene, Idaho 83814	Located near Sunrise Terrace; site is believed to be an abandoned lot; approximately 100 feet on all sides; two underground storage tanks on ground surface; two 55-gallon drums tipped over; black, tar-like stains on ground surface. Site visit and report, June 1991.
5.	Ramsey Road Landfill Kootenai County	Located 1 to 1.5 miles from Sunrise Terrace; according to IDEQ, unlined landfill in use since before 1951; no monitoring wells. Site visit and report, May 1991.
6.	Tom Addis Dodge Jerry's Body Shop 320 W. Kathleen Coeur d'Alene, Idaho 83814	Shops are connected; listed in EPA RCRA records as generators of ignitable wastes.
7.	Knutsen Chevrolet 1710 W. 4th Street Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as generators of ignitable wastes.
8.	Robideauz Motor Company 1603 Sherman Avenue Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as generators of unidentified hazardous wastes.
9.	Emerald Cleaners 826 N. 4th Street Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as generators of ignitable wastes and spent halogenated solvents which include TCE.
10.	Coeur d'Alene Laundry and Drycleaning 106 W. Haycraft Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as a generator of waste perchloroethylene; drums located outside building are marked "Toxic" and "PERC."
11.	Lloyd Sanberan Auto Electric 1916 Sherman Avenue Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as generators of ignitable wastes.

Table 2-2

POTENTIAL SOURCES OF GROUNDWATER TCE CONTAMINATION
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO

No.	Site Name/Address	Comments
12.	Lake City Ford Auto Body 1503 N. 4th Street Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as generators of ignitable wastes.
13.	Idaho Department of Transportation 1917 Government Way Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as a generator of D-wastes and spent halogenated and nonhalogenated wastes which include TCE.
14.	Lake City Ford 1508 N. 4th Street Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as a generator of spent halogenated and nonhalogenated solvents which include TCE.
15.	Idaho Department of Transportation 2902 Ramsey Road Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as a generator of spent halogenated and nonhalogenated solvents which include TCE. Site visit and report, June 1991.
16.	One Hour Martinizing 302 Spokane Avenue Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as generators of ignitable wastes; drycleaners are also known to use TCE.
17.	Sunset Laundry and Dry Cleaners 2514 N. 4th Street Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as a generator of spent halogenated wastes which include TCE.
18.	French Cleaners and Shirt Laundry 305 Locust Avenue Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as a generator of spent halogenated solvents which include TCE.
19.	Al's Auto Supply 402 S. Neider Avenue Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as a generator of spent halogenated solvents which include TCE.
20.	Silver Lake Autobody E. 202 Appleway Coeur d'Alene, Idaho 83814	Listed in EPA RCRA records as generators of ignitable wastes.
21.	Dry Cleaning and Laundry Village 1136 4th Street Coeur d'Alene, Idaho 83814	Six 10-gallon drums labeled "perchloroethylene" were located behind the shop.
22.	Dalton Fabricators and Welding 505 Government Way Coeur d'Alene, Idaho 83814	Several unidentified 55-gallon drums located on shop property.
23.	C & S Transmission W. 180 Dalton Avenue Coeur d'Alene, Idaho 83814	Several unidentified 55-gallon drums located behind enclosure on shop property. Site visit and report, May 1991.



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COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

Source: Davis and Olsen, 1990, Predicting the Fate of Organic Compounds, Part 2, Hazardous Materials Control, July/August 1990

Figure 2-3
CONCEPTUAL TRANSFORMATIONS OF CHLORINATED ALIPHATIC HYDROCARBONS

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	3-28-95	ZO3901	2135FG

Table 2-2

POTENTIAL SOURCES OF GROUNDWATER TCE CONTAMINATION
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO

No.	Site Name/Address	Comments
24.	Custom Engine Rebuilding W. 275 Dalton Avenue Coeur d'Alene, Idaho 83814	Several unidentified 55-gallon drums located on property.
25.	Jim's Radiator Service 6454 W. Clayton Coeur d'Alene, Idaho 83814	Three 55-gallon drums labeled VARSOL-3 located on property; stains on ground surface.
26.	Interstate Concrete and Asphalt 845 W. Kathleen Coeur d'Alene, Idaho 83814	Large pit approximately 1 mile from Sunrise Terrace; processes and waste management unknown.

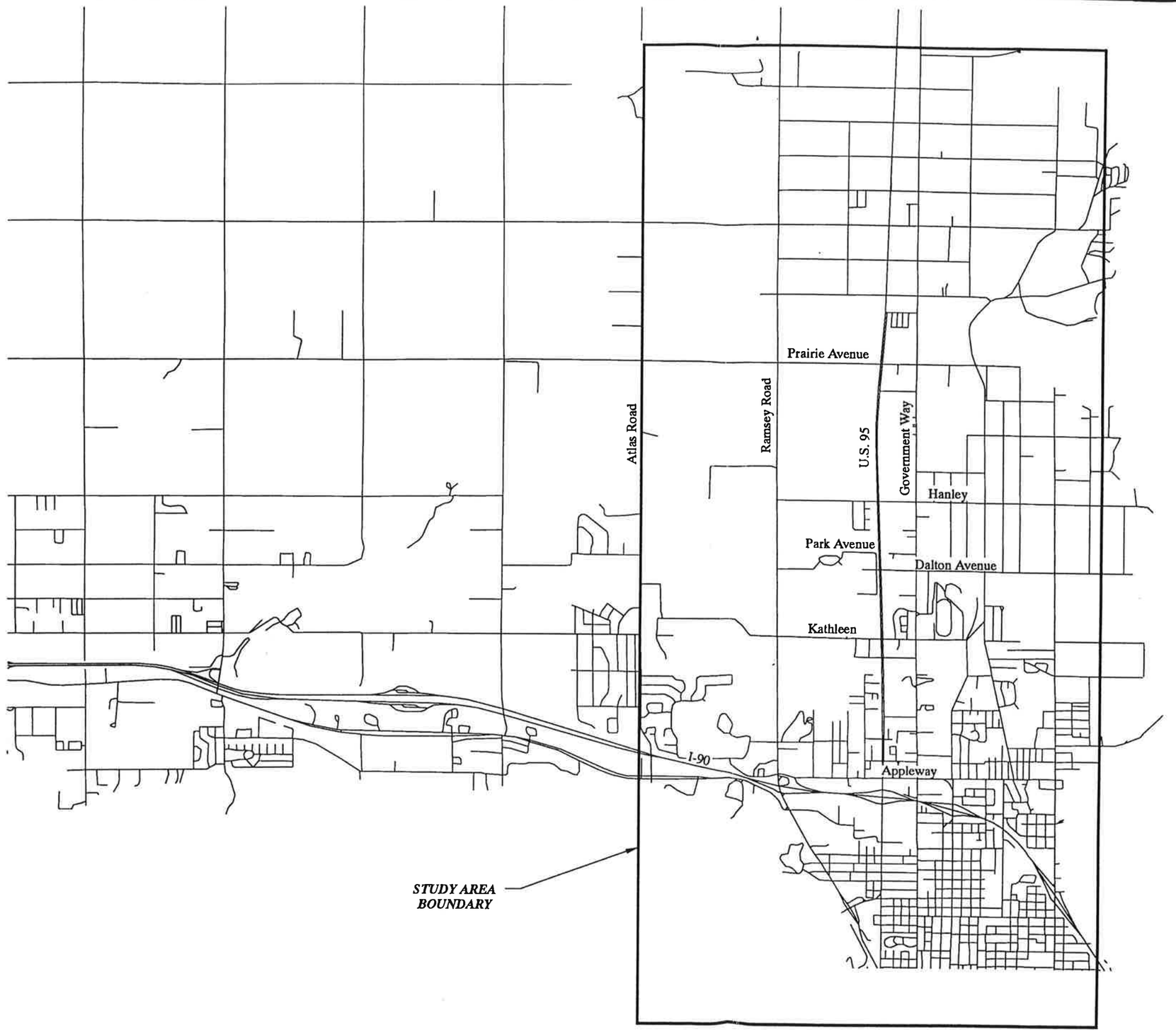

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Figure 2-1
COEUR D'ALENE STUDY AREA

COEUR D'ALENE GROUNDWATER CONTAMINATION SITE
Coeur d'Alene, Idaho

DRAWN BY:	DATE:	JOB NO:	DWG NO:
GIS	7-10-95	ZO3055	2136FG.CDR

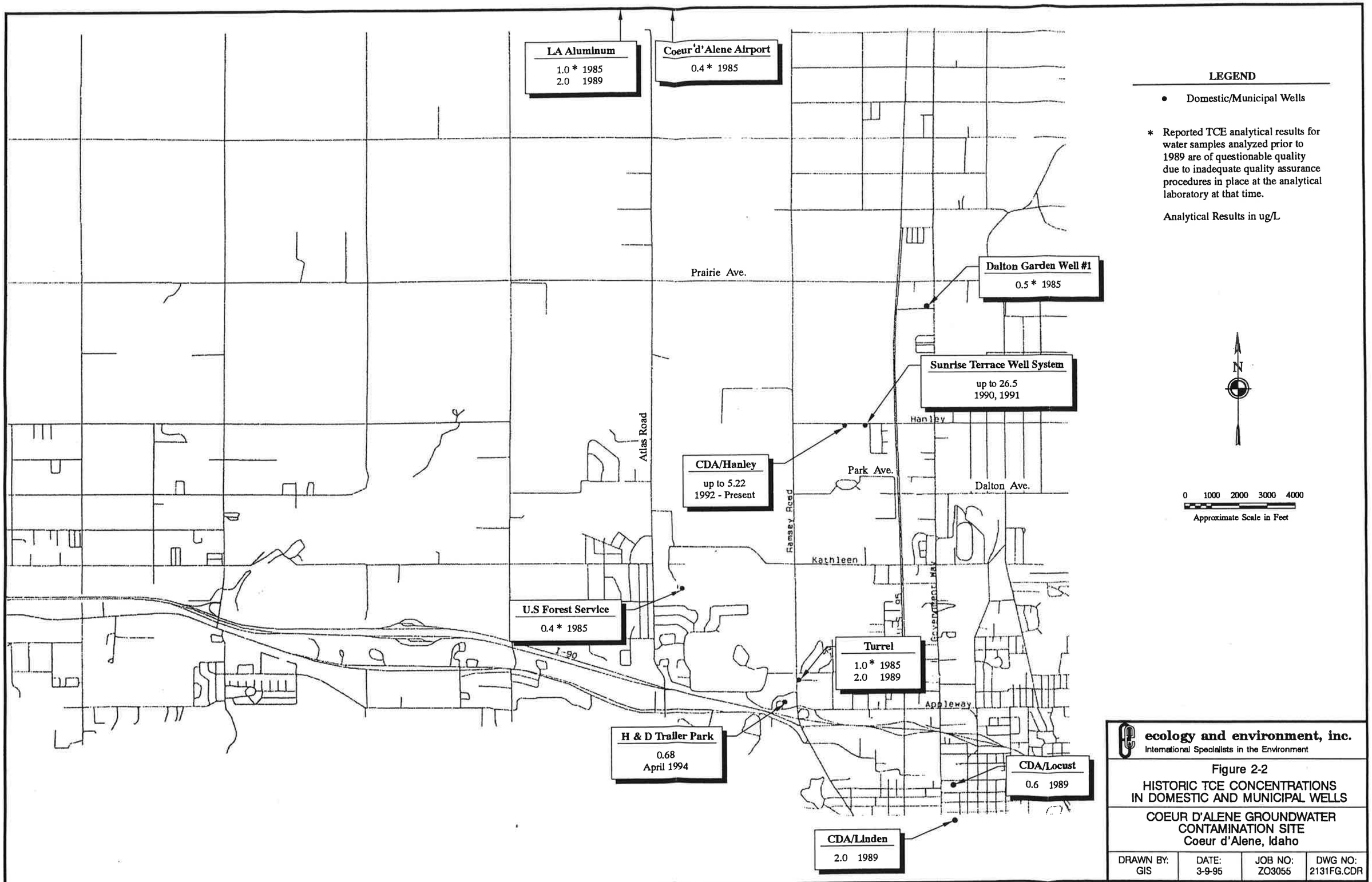

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Figure 2-2
HISTORIC TCE CONCENTRATIONS IN DOMESTIC AND MUNICIPAL WELLS

COEUR D'ALENE GROUNDWATER CONTAMINATION SITE
Coeur d'Alene, Idaho

DRAWN BY:	DATE:	JOB NO:	DWG NO:
GIS	3-9-95	ZO3055	2131FG.CDR

3. FIELD ACTIVITIES AND ANALYTICAL PROTOCOL

This section describes field activities, including sampling protocol, monitoring well installation, water level measurements, and well and sample location surveying. It also describes analytical protocol. Analytical results of samples collected during the ESI are discussed in Sections 5 and 6.

Field activities were conducted during three separate field events from June to December 1994 to address the objectives of the CDA ESI. Field activities included:

- Investigating, documenting, and determining the potential magnitude of TCE contamination in soil gas and subsurface soils at the potential sources identified in Section 2.2;
- Sampling wells within the site boundary to identify wells that may pose a public health risk and to enhance the understanding of the TCE plume in the aquifer. Effort was concentrated on the deepest wells pumping the greatest amount of water, as those were expected to contain the greatest amounts of TCE;
- Measuring water levels in area wells, in conjunction with surveying well elevations, to refine the understanding of area groundwater flow;
- Installation of one monitoring well on a potential source of TCE contamination, with concurrent soil gas, subsurface soil, and groundwater sampling to document migration of TCE from the potential source to the aquifer;
- Installation of one monitoring well upgradient of a potential TCE source; and
- Logging sample locations using a Global Positioning System (GPS) unit to aid in data management and to update the current GIS map of the area.

Analyses included a combination of fixed and mobile laboratory analyses.

3.1 SAMPLING AND ANALYTICAL METHODOLOGIES

Seven potential source areas were investigated during Phase I field activities, conducted during the weeks of June 6 and 13, 1994. These source areas were chosen based on information collected during previous EPA activities and from observations made while in the field. Phase I field activities included the collection of 113 soil gas samples, 17 subsurface soil samples, and one storm water sewer sample from potential source areas. Soil gas and subsurface soil samples were collected with a Geoprobe™ at the following potential source areas:

- Deming Industries,
- Advanced Input Devices,
- Former Idaho Department of Transportation (IDOT) on Government Way,
- Current IDOT on Ramsey Road,
- Kootenai County Ramsey Road Landfill,
- Park Avenue/Dalton Avenue area (including the former Asphalt Batch Plant and GTE); and
- Interstate Concrete and Asphalt.

In addition, during Phase I field activities, groundwater was sampled from 26 area wells.

Phase II field activities were conducted from September 20 through October 21, 1994, and included the installation of two monitoring wells and the collection of soil gas, subsurface soil, and groundwater samples during drilling. Eleven soil gas samples, 16 subsurface soil samples, and 17 groundwater samples were collected during drilling of monitoring well 1 (MW-1). Four subsurface soil samples and four groundwater samples were collected during drilling of MW-2. In addition, one vapor sample was collected from MW-1, and one oil sample was collected from the presently unused Magnuson well.

Phase III field activities were conducted from December 12 through 20, 1994, and included the collection of groundwater samples from MW-1 and MW-2, and eight area wells. In addition, four vapor samples were collected from the wellhead of MW-1, and one oil

sample and one groundwater sample were collected from the presently unused Magnuson well.

The timing of the three phases of field activities is illustrated in Figure 3-1. Detailed descriptions of sampling and analytical methodologies for Phases I, II, and III of the CDA ESI activities are presented below.

3.1.1 Soil Gas and Soil Sampling at Potential Source Areas

Soil gas and subsurface soil samples were collected by EPA's Environmental Services Assistance Team (ESAT) personnel using a Geoprobe™. Specific sampling locations were determined in the field by EPA or E & E personnel. Supelco VOCARB™ Carbowax 4000 volatile organics traps were used to collect the field soil gas samples. Following sample collection, holes were abandoned by filling with bentonite chips.

Soil gas samples also were collected from the Kootenai County Ramsey Road Landfill through existing probes installed around the perimeter of the landfill. Probes varied in depth from approximately 20 feet to over 80 feet BGS. Supelco VOCARB™ Carbowax 4000 volatile organics traps were used to collect the field soil gas samples. The traps were lowered into the existing sampling probe attached to the end of the sampling tubing, and a sample was drawn through the trap with a vacuum pump at the surface.

Field soil gas samples were analyzed in the ESAT field laboratory, under EPA's Field Analytical Support Program (FASP), for TCE, 1,1-DCE, cis-1,2-DCE, and trans-1,2-DCE per the ESAT SOP (ESAT-10A-6955).

On the basis of the of FASP soil gas results, locations were chosen to collect confirmation soil gas and subsurface soil samples. Confirmation soil gas samples were collected using 6-liter Summa™ Canisters instead of Carbowax traps, at locations as near to the original field sample locations as possible. Confirmation soil gas samples were shipped to the EPA Region 10 laboratory for Method 8240 VOC analysis.

NOTE: PROBLEMS WITH PROCEDURES USED TO COLLECT AND ANALYZE THE SOIL GAS SAMPLES DURING PHASE I FIELD ACTIVITIES HAVE BEEN IDENTIFIED. THE PROBLEMS INCLUDE BOTH FIELD AND

CONFIRMATION SOIL GAS SAMPLES COLLECTED BY ESAT AND ANALYZED AT BOTH THE ESAT FIELD LABORATORY (FASP) AND EPA REGION 10 LABORATORY DURING PHASE I FIELD ACTIVITIES. BASED UPON THESE PROBLEMS, IT HAS BEEN DETERMINED THAT THE PHASE I SOIL GAS ANALYTICAL RESULTS ARE NOT VALID. AT THE REQUEST OF EPA, THE PHASE I FASP SOIL GAS RESULTS ARE INCLUDED IN THIS REPORT FOR INFORMATIONAL PURPOSES. AVAILABLE INFORMATION SUGGESTS THAT THE CONFIRMATION SOIL GAS SAMPLE RESULTS PRESENTED HEREIN ARE BIASED LOW (APPENDIX A).

Subsurface soil samples were collected per the ESAT SOP (ESAT-10A-6963), with the Geoprobe™ Probe-Drive/Large Bore sampler, which allowed a 1.125-inch-diameter discrete soil sample to be obtained at the desired depth. Confirmation soil gas samples were shipped to the EPA Region 10 laboratory for Method 8240 VOC analysis.

3.1.2 Groundwater Sampling from Domestic and Municipal Wells

Groundwater samples were collected from existing domestic or municipal wells during Phase I field activities per the E & E SOP included in the QAPjP for Phase I activities (E & E 1994d) and during Phase III field activities per the FOWP/QAPjP for Phase II activities (E & E 1994c). Sampling followed purging the wells from the spigot nearest to the wellhead for at least 15 minutes.

Field measurements were performed with standard monitoring equipment for pH, specific conductivity, and temperature. It was noted during Phase I sampling, however, that the conductivity meter did not work properly. Samples were collected in 40-mL volatile organic analysis (VOA) vials for analysis. Samples collected during Phase I were analyzed in the ESAT field laboratory for TCE, 1,1-DCE, cis-1,2-DCE, and trans-1,2-DCE per the ESAT SOP (ESAT-10A-6957). Confirmation samples were submitted to the EPA Region 10 laboratory for Method 8240 VOC analysis. Samples collected during Phase III field activities were analyzed at the EPA Region 10 laboratory for Method 8260 VOC analysis.

3.1.3 Soil, Soil Gas, and Groundwater Sampling During Monitoring Well Installation

Monitoring Well MW-1

Based on the results of the source area investigations conducted in the first phase of field work, one monitoring well (MW-1) was installed adjacent to the drainfield at Deming Industries, one of the potential source areas investigated during Phase I field activities. During drilling, soil gas and subsurface soil samples were collected in the unsaturated zone in an attempt to trace the TCE migration from the surface to the aquifer, and assist in identifying potential confining layers in the subsurface where TCE was potentially accumulating or located at relatively higher concentrations. Soil gas sampling was used in conjunction with subsurface soil sampling because of the high volatility of TCE and the possibility that TCE might not be detected in the soils, but might be detected as a vapor in the coarse subsurface formation. Groundwater samples also were collected during drilling.

A total of 16 soil samples were collected at 14 depth intervals in both the saturated and unsaturated zones with an 18-inch-long, 2.5-inch-inside-diameter (ID), split-tube soil sampler according to the procedure presented in the FOWP/QAPjP for Phase II activities (E & E 1994c). Soil samples were analyzed at ESAT's field laboratory for TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride. Three soil samples were submitted to the EPA Region 10 laboratory for EPA Method 8260 VOC analysis.

A total of 11, deep, soil gas samples were collected while drilling through the unsaturated zone of MW-1. Soil gas sampling was accomplished according to the procedure specified in the FOWP/QAPjP for Phase II activities (E & E 1994c). The option to lower and drive the Geoprobe™ soil gas assembly via a cable-mounted hammer assembly as opposed to a tremie pipe-mounted hammer assembly was executed, resulting in substantial time savings over the tremie-pipe method. After several trials, a means was devised to immobilize the sorption tube assembly within its housing in order to protect it from the force of the hammer blows and minimize the tendency of fittings to disconnect when the probe is hammered into the formation. Nonetheless, in spite of this system and the care exercised in assembling and disassembling the sampling assembly, on several occasions the fittings were found to be disconnected upon disassembly. In such cases, it was assumed that they became disconnected during hammering, not disassembly, and another sample attempt was made. On several

occasions, the sorption tube was bent upon disassembly. If the tube could be straightened, it was delivered to the laboratory for analysis. Soil gas samples were analyzed at ESAT's field laboratory for TCE, 1,1-DCE, cis-1,2-DCE, and trans-1,2-DCE per the ESAT SOP (ESAT-10A-6966).

A total of 17 groundwater samples, including four duplicates and one confirmation sample, were collected during drilling through the saturated zone of MW-1. Groundwater samples were collected with a Hydropunch™ in accordance with the specifications of the FOWP/QAPjP for Phase II activities (E & E 1994c). Water sampling at most sampling depths below 195 feet BGS was complicated by the extreme mobility of the saturated sands encountered below that depth (discussed further in Section 3.2). Upon drilling to a designated sampling depth, liquefied sands rapidly migrated into the wellbore. As long as the compressed air was circulating, the sands would be removed from the wellbore (accumulating at the surface in soil bins). Immediately upon cessation of compressed air circulation, however, the sands would typically heave 10 to 30 feet, and as much as 80 feet. Several corrective measures were taken by the drillers to minimize the heaving, including switching to a smaller diameter drilling bit and a smaller diameter downhole hammer to minimize the swabbing effect, and driving the Hydropunch with the drill string instead of the hammer, also to minimize the swabbing effect. In spite of these measures, the heaving sands persisted. After consultation with EPA, it was decided to add sufficient potable water to the wellbore upon drilling to a given sampling depth to equalize the hydrostatic pressure and prevent the sands from mobilizing. This measure was used with success to collect samples from 255, 275, and 295 feet BGS. At depths below 295 feet BGS, however, this method was unsuccessful because the sands would heave before a sufficient amount of potable water could be pumped into the borehole. After further consultation with EPA, it was decided for subsequent sampling attempts to allow the sands to heave, and to drive the Hydropunch into the heaved sand within the drive casing to collect the groundwater sample. It is assumed that the sand and the interstitial water sampled by this method mobilized from the zone around the casing shoe, and were thus representative of the formation at the depth of the casing shoe. Samples from depths at and below 315 feet BGS were collected by this method. Groundwater samples were analyzed at ESAT's field laboratory for TCE, 1,1-DCE, cis-1,2-DCE, and trans-1,2-

DCE according to the ESAT SOP (ESAT-10A-6957). The confirmation sample was submitted to the EPA Region 10 laboratory for EPA-DW volatile organics analysis.

Monitoring Well MW-2

A second monitoring well (MW-2) was installed at a location upgradient of MW-1 to provide information on background levels of TCE and its breakdown products. During the drilling of MW-2, soil and groundwater samples were collected. Soil samples were collected with a split-tube soil sampler according to the procedure specified in the FOWP/QAPjP from depths of 20, 80, 165, and 198 feet BGS. Groundwater was sampled with a Hydropunch sampler from 198 feet BGS according to the procedure specified in the FOWP/QAPjP for Phase II activities (E & E 1994c). Soil and groundwater samples were submitted to the EPA Region 10 laboratory for EPA Method 8260 VOC analysis and EPA-DW volatile organics analysis, respectively.

3.1.4 Groundwater Sampling from Monitoring Wells

During the third phase of field activities, dedicated submersible pump systems were installed in MW-1 and MW-2, and groundwater samples were collected. Samples were collected utilizing low-flow purging and sampling techniques according to the specifications in the FOWP/QAPjP for Phase II activities (E & E 1994c). Samples were submitted to EPA Region 10 laboratory for EPA Method 8260 VOC analysis.

3.1.5 Groundwater and Oil Sampling from the Magnuson Well

In addition to the domestic and municipal well sampling discussed above, an oil and a water sample were collected from the presently unused Magnuson well during Phase III field activities. During Phase II field activities, the pump was pulled from the Magnuson well in preparation for the collection of a water sample. Following removal of the pump, an attempt was made to collect a water sample with a bailer. It was observed at this time that a column of oil a minimum of 3 feet thick (the length of the bailer) was present within the 12-inch well casing. A sample of this oil was submitted to the EPA Region 10 laboratory for EPA Method 8260 VOC analysis and EPA Method 8080 polychlorinated biphenyls (PCB) analysis. During

Phase III field activities, another sample of this oil was taken and approximately 37 gallons of oil was removed using a bailer. Following removal of the oil, three well volumes of water were purged from the well with a 4-inch submersible pump, and a sample was collected using a bacon bomb in accordance with the FOWP/QAPjP for Phase II activities (E & E 1994c). The groundwater sample was submitted to the EPA Region 10 laboratory for EPA Method 8260 VOC analysis. The oil sample was submitted to the EPA Region 10 laboratory for EPA Method 8260 VOC analysis and EPA Method 8080 PCB analysis.

3.1.6 Soil Gas Sampling from Monitoring Well MW-1

At the close of Phase II field activities, following the installation of MW-1, a vapor sample was collected from the wellbore of MW-1. A Supelco VOCARB™ Carbowax 4000 volatile organics trap was fitted at the end of a length of Teflon tubing and lowered into the well to a depth of approximately 177 feet BGS. The organics trap could not be lowered to a depth closer to the well screen, the top of which is set at 186 feet BGS, due to insufficient tubing length. Upon lowering the organics trap into the well, a pneumatic pump was used to draw approximately 500 mL of gas through the trap at a rate of approximately 40 mL/min. A packer was not used to seal off the upper portion of the well casing from the sampling interval during sample collection. The sample was submitted to the ESAT laboratory for analysis for TCE, cis- and trans-1,2-DCE, PCE, and vinyl chloride.

During Phase III field activities, four soil gas samples were collected from the wellhead of MW-1 in order to determine whether VOC contaminant vapors could be removed from the subsurface at rates sufficiently high to warrant vapor recovery as a means of source control. A packer was not used to seal off the screened interval from the well casing. A pneumatic pump was used to purge the well through a port in the sealed well cap at a rate of approximately 1.0 cubic feet per minute (ft^3/min). After purging for approximately 1 hour (approximately 3.5 well volumes), collection of the first sample began. The sample was collected by drawing the wellhead gas through a Supelco VOCARB™ Carbowax 4000 volatile organics trap with the pneumatic pump at a rate of approximately 40 mL/min for 60 minutes. Following collection of the first sample, the well was purged at a rate of approximately 1.0 ft^3/min for 3 hours, at which time the second sample was collected in the same manner as the first. The

third sample was collected in the same manner following an additional 3-hour purging. The fourth sample was collected in the same manner following a 1.5-hour purging. Samples were submitted to the EPA Region 10 laboratory for EPA Method 8260 VOC analysis in accordance with the FOWP/QAPjP for Phase II activities (E & E 1994c).

3.1.7 Groundwater Sampling from Monitoring Wells for Metals

During Phase III field activities, MW-1 and MW-2 were sampled for total metals. Samples were collected utilizing low-flow purging and sampling techniques and submitted to EPA's Region 10 laboratory for Metals Target Analyte List (TAL) analysis according to the specifications in the Sample Plan Alteration Form for the FOWP/QAPjP for Phase II activities (E & E 1994c).

3.1.8 Soil Sampling from Monitoring Wells for Metals

Subsequent to receiving total metals analytical results for groundwater samples collected from MW-1 and MW-2, it was decided to analyze soil samples collected during drilling of MW-1 and MW-2 for metals. Soil confirmation samples previously submitted to EPA's Region 10 laboratory for EPA Method 8260 VOC analysis during Phase II field activities were analyzed for metals after being retrieved from refrigerated storage. A total of three samples from MW-1 and five samples from MW-2 were submitted for analysis. The samples were analyzed for TAL metals, exclusive of mercury and cyanide, in accordance with the Sample Plan Alteration Form for the FOWP/QAPjP for Phase II activities (E & E 1994c).

3.2 MONITORING WELL INSTALLATION AND DEVIATIONS FROM THE FOWP/QAPjP

3.2.1 Monitoring Well MW-1

MW-1 was installed using the optional contingency drilling method specified in the FOWP/QAPjP for Phase II activities (E & E 1994c) with an air rotary rig and a combination of direct air rotary and STRADEX (ODEX equivalent) equipment. The initial 100 feet was drilled with 10.75-inch-ID drive casing. Drilling from 100 feet BGS to the total depth of 405 feet BGS was accomplished utilizing 8.75-inch-ID drive casing. A STRADEX drilling

bit was utilized to drill to 235 feet BGS. The STRADEX bit was substituted with a standard roller cone rotary bit to drill the remainder of the borehole to 405 feet BGS due to complications with heaving sands encountered throughout the saturated zone (below 195 feet BGS).

Drilling through the saturated zone at MW-1 was complicated by the extreme mobility of the unconsolidated sands. The heaving sands presented difficulties in the collection of water samples during drilling (discussed above) and in the handling and storing of drilling cuttings. Cuttings from drilling through both the unsaturated and saturated zones were collected and stored in 20-cubic-yard soil bins. It was originally anticipated that one soil bin would be required to containerize all the cuttings generated during drilling. As a result of heaving sands, however, a total of five soil bins were required. Aside from the generation of more cuttings than anticipated, and the accompanying difficulties related to collecting water samples and handling and storing these cuttings, drilling of MW-1 was accomplished according to the specifications presented in the FOWP/QAPjP.

Based upon field analytical results of water samples (discussed in Section 6), it was decided to discontinue drilling at a depth of 405 feet BGS and install a well with a screened interval straddling the water table (approximately 195 feet BGS). Prior to installing the well, the borehole was backfilled from a depth of 405 feet BGS to a depth of 214 feet BGS with a combination of high solids bentonite grout, portland cement/bentonite grout, and bentonite chips. In the initial attempt to backfill the borehole, the portland cement/bentonite grout flash-set in the casing, requiring that the casing be drilled out.

The well construction details of MW-1 are presented in Table 3-1 and Appendix B. MW-1 was constructed with materials and design in accordance with the FOWP/QAPjP for Phase II activities (E & E 1994c) except that a 20-foot screen section was installed, rather than the planned 10-foot section. The longer screen section was selected in order to accommodate fluctuations in the water table. The base of the screen section was installed at 206 feet BGS. A sand pack of 20/40-mesh clean silica sand was emplaced from 214 to 180 feet BGS. A 5-foot-thick bentonite chip seal was emplaced above the sand pack to a depth of 175 feet BGS. The remainder of the annulus between the 4-inch Schedule 80 PVC riser and the borehole wall was backfilled with a combination of high solids bentonite grout, portland cement/bentonite grout, and bentonite chips to approximately 3 feet BGS. Losses of

annular materials occurred as a result of the grout dispersing through gravelly zones in the formation under the hydrostatic pressure of the grout. This was eventually compensated by adding bentonite chips to the hole. A length of 8-inch-diameter protective steel casing fitted with a locking steel cap was set in a concrete plug from 3 feet BGS to several inches BGS. At the request of the landowner (Mr. Mike Deming), the well was completed with a vault completion rather than an above-ground completion as specified in the FOWP/QAPjP. A 12-inch-diameter vault encases the 8-inch-diameter protective steel casing, and is set in an envelope of concrete, the surface of which slopes away from the vault cover.

MW-1 was developed several days after installation. Development of MW-1 was accomplished by swabbing, bailing, and pumping with a 2-inch submersible pump according to the criteria described in the FOWP/QAPjP for Phase II activities (E & E 1994c). MW-1 was bailed until the amount of silt in the water was sufficiently low to allow pumping. A total of approximately 200 gallons of water (approximately 23 well volumes) was bailed. During pumping, water quality parameters (temperature, pH, turbidity, dissolved oxygen, and electrical conductivity) were measured continuously with a flow-through cell. All water quality parameters except turbidity were stabilized to within 10% after approximately 40 gallons (approximately 5 well volumes) were pumped. Turbidity decreased from an initial value of greater than 900 nephelometric turbidity units (NTU) to values ranging from 100 to 150 NTU after approximately 100 gallons (approximately 12 well volumes) were pumped. Turbidity remained relatively stable at values ranging from 100 to 150 NTU with continued pumping. After a total of 260 gallons (approximately 30 well volumes) were pumped with no further decrease in turbidity, pumping was discontinued.

During the third phase of field activities (conducted between December 12 and 20, 1994), a dedicated pump was installed in MW-1 in accordance with the FOWP/QAPjP for Phase II activities (E & E 1994c). A Grundfos Redi-Flo2, 2-inch submersible pump fitted with Teflon-lined polyethylene tubing was installed with the pump intake set at 205 feet below the top of casing.

3.2.2 Monitoring Well MW-2

MW-2 was drilled to a total depth of 215 feet BGS with an air rotary rig equipped with 8.75-inch-ID drive casing and a standard roller cone bit. Since the well was drilled to only a shallow depth below the water table (encountered at approximately 193 feet BGS), heaving sands did not present a problem as they did during the MW-1 drilling. Details of the MW-2 well installation and completion are essentially identical to those of the MW-1, and are presented in Table 3-1 and Appendix B. The principal differences between MW-1 and MW-2 installations are: backfilling of the borehole to well-setting depth was not required for MW-2; loss of grout to the formation during backfilling of the annulus was not as great a problem at MW-2; and slight differences in the depths of emplacement of well and annular materials. As with MW-1, MW-2 was finished with a vault completion at the request of the landowner. Details of the vault completion for MW-2 are essentially identical to MW-1.

Several days after installation, MW-2 was developed in a manner similar to that of MW-1, via a combination of swabbing, bailing, and pumping. After approximately 85 gallons (approximately 9 well volumes) were swabbed, the well was pumped with a 2-inch submersible pump. Temperature, pH, dissolved oxygen, and electrical conductivity stabilized to within 10% after several well volumes were pumped. Turbidity values decreased from initial values of greater than 1000 NTU to values ranging from approximately 50 to 200 NTU after approximately 50 gallons (approximately 5 well volumes) were pumped. Turbidity became relatively stable at values ranging from approximately 40 to 140 NTU until after approximately 300 gallons (approximately 30 well volumes) were pumped, at which point the pump rate was reduced from approximately 7 gpm to approximately 6 gpm. Turbidity then decreased to values of approximately 25 NTU. A total of approximately 320 gallons (approximately 32 well volumes) were pumped.

During the third phase of field activities (conducted between December 12 and 20, 1994), a dedicated pump was installed in MW-2 in accordance with the FOWP/QAPjP for Phase II activities (E & E 1994c). A Grundfos Redi-Flo2, 2-inch submersible pump fitted with Teflon-lined polyethylene tubing was installed with the pump intake set at 205 feet below the top of casing.

3.3 WATER LEVEL MEASUREMENTS

During Phase I of field activities, water levels were measured in area domestic and municipal wells per the E & E QAPjP for Phase I activities (E & E 1994d). Water level measurements were taken from a total of six wells over a 9-hour period on June 14, 1994. Levels were collected from those wells that were accessible to a water level meter, either by a sampling port at the wellhead or the annular space if it was sufficient to allow entry of the probe without risk of entanglement. The City of Coeur d'Alene Hanley well, Locust well, Linden well, Atlas well, and 4th & Best well were active at the time that the water levels were measured. Several high capacity irrigation wells in the study area also were active at this time.

During Phase III of field activities, a second round of water level measurements was taken in accordance with the FOWP/QAPjP for Phase II activities (E & E 1994c). Water levels were measured at a total of nine wells over a 10.5-hour period on December 16, 1994. Although a water level was not taken at the Respondt well as planned, one was taken from the Magnuson well. It was not possible to measure a water level from the monitoring well at the Kootenai County Landfill because the well had been abandoned. Water levels were also measured at monitoring wells MW-1 and MW-2. The City of Coeur d'Alene Hanley well was actively pumping on the day that the water levels was measured. Two water levels were measured at the Hanley well: a pumping water level and a water level measured approximately 10 minutes after the pump was temporarily shut off. The water levels were 267.95 feet and 263.18 feet below the top of the reference point, respectively. None of the other municipal wells were active during the week the water levels were measured. No irrigation wells or any other high capacity wells are believed to have been pumping at the time of the water level measurements.

3.4 WELL ELEVATION SURVEYING

Elevations of domestic, municipal, and monitoring wells whose water levels were measured during Phase I and Phase III field activities were surveyed in accordance with the FOWP for Phase I field activities and the FOWP/QAPjP for Phase II activities, respectively.

3.5 GLOBAL POSITIONING SYSTEM SURVEY

Locations of soil and soil gas samples, and domestic and municipal wells sampled during Phase I field activities were logged with GPS units during Phase I field activities in accordance with the FOWP for Phase I field activities. E & E personnel used EPA GPS rover units to collect X and Y coordinate data with a minimum 5-meter Circular Error Probable (CEP) accuracy. Base station data for rover data correction was obtained from Kootenai Electric Company in Hayden, Idaho. GPS locations were downloaded into E & E's GIS system. Due to equipment difficulties during Phase III activities, the locations of MW-1, MW-2, and the City of Coeur d'Alene Locust and Linden wells were not logged with GPS as planned. Temporary locations of these wells have been added to E & E's GIS system by manually locating their positions on a GIS basemap.???

Table 3-1

MONITORING WELLS CONSTRUCTION DETAILS
PHASE II FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO

		MW-1	MW-2
Date Well Installation Completed		October 11, 1994	October 15, 1994
Total Depth of Borehole (BGS)		405 feet	214 feet
Total Depth of Well (BGS)		208.5 feet	207.5 feet
Screen Depth (BGS)	Top	186 feet	185 feet
	Base	206 feet	205 feet
Elevation/Top of Casing (MSL)		2240.38 feet	2239.48 feet
Elevation/Top of Access Port of Dedicated Pump (MSL)		2240.46 feet	2239.57
Well Construction Materials	Sump	Stainless steel, 2.5 feet	Stainless steel, 2.5 feet
	Screen	Two 10-foot sections of stainless steel, 0.010-inch slot	Two 10-foot sections of stainless steel, 0.010-inch slot
	Casing	Schedule 5 type 304 stainless steel (186 feet to 166 feet) Schedule 80 PVC (166 feet to surface)	Schedule 5 type 304 stainless steel (185 feet to 165 feet) Schedule 80 PVC (165 feet to surface)
Pump		Dedicated Grundfos RediFlo2, 2-inch submersible pump, intake set at 205 feet below top of casing	Dedicated Grundfos RediFlo2, 2-inch submersible pump, intake set at 205 feet below top of casing
Surface Completion		Vault	Vault

BGS - Below ground surface.
MSL - Mean sea level.

PROJECT FIELD ACTIVITIES SCHEDULE

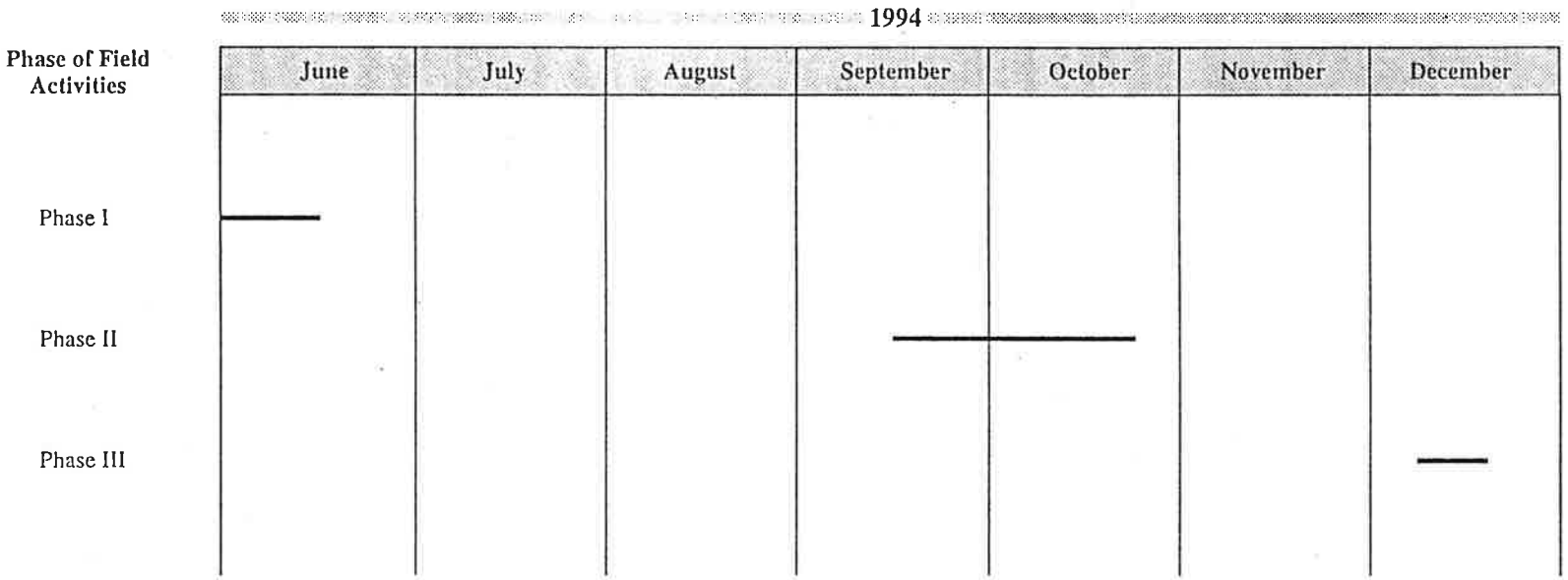

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Figure 3-1
PROJECT FIELD ACTIVITIES SCHEDULE

COEUR D'ALENE GROUNDWATER CONTAMINATION ESI
Coeur d'Alene, Idaho

DRAWN BY:	DATE:	JOB NO:	DWG NO:
AS	7-13-95	ZO3055	33FG

4. QUALITY ASSURANCE/QUALITY CONTROL

This section describes the quality assurance and quality control measures taken for the CDA ESI Analytical Program, and provides an evaluation of the usability of analytical data presented in Sections 5 and 6.

All samples were collected following the guidance of the FOWP and QAPjP (E & E 1994b and 1994d) and the ESAT SOPs (ESAT-10A-6966; ESAT-10A-6963) for the Phase I of field activities (except as noted in the 17 April 1995 EPA Region 10 Laboratory FASP Soil Gas Memorandum included in Appendix A), and the FOWP/QAPjP (E & E 1994c) for the Phase II and field activities. Samples were analyzed in the field per the ESAT SOPs for analysis of volatile organics in soil gas, soil, and water (ESAT-10A-6957 and ESAT-10A-6955), except as noted in the EPA Region 10 Laboratory Memorandum included in Appendix A.

All data, both ESAT mobile laboratory data and EPA Region 10 laboratory data were reviewed and validated by ESAT chemists and data qualifiers were applied as necessary according to the following guidance:

- "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," (February 1994); and
- ESAT's SOPs for VOC Field Analyses Methodologies.

Copies of the ESAT data quality assurance memoranda are included in Appendix C.

4.1 Satisfaction of Data Quality Objectives

The data quality objectives guidance used for this ESI were different for the first and second phases of field activities. During the first phase of field activities the following EPA guidance documents were used to establish DQO's:

- Guidelines and Specifications for Preparing Quality Assurance Program Plans, QAMS-004/80, Quality Assurance Management Staff, Office of Monitoring Systems and Quality Assurance, Office of Research and Development, EPA, September 20, 1980; and

- Interim Final Guidance for the Quality Assurance/Quality Control Interim Guidance for Removal Activities, OSWER Directive 9360.4-01, EPA Office of Emergency and Remedial Response, Washington, DC.

These two guidance documents were cited to ensure that the EPA Removal Program and the EPA Remedial Program data quality needs were met. According to this guidance, QAMS Level 2 and/or OSWER Level 2 were selected as levels of data quality that would meet the project data objectives. These QA levels required analyses in a fixed laboratory according to approved SW-846 or CLP methods for analysis in the field laboratory with 10% of the samples submitted to a fixed laboratory for conformational analyses. These data quality requirements were met for all analytical data generated during Phase I of field activities.

The Phase II field activities presented in the FOWP/QAPjP (E & E 1994c) utilized the most current EPA guidance:

- Data Quality Objectives Process for Superfund, Interim Final Guidance, September 1993, EPA 540-R-93-071.

The FOWP/QAPjP erroneously stated the required data quality level of most analyses performed for the project as QA Level 2. QA Level 2 requires the collection and analysis of eight replicate samples per sample matrix to determine error and bias of sample results. This was not performed. QA Level 1 was used for the majority of the sampling and analysis conducted during the second phase of field activities, and consisted of both EPA Region 10 laboratory analysis and ESAT mobile laboratory analyses with 10% confirmation at EPA's Region 10 laboratory. The field analysis of soil gas samples did not meet QA Level 1 data quality requirements, as confirmation samples were not collected.

The data quality performed during both the first and the second phases of field work were sufficient in producing data that could be used for the data objectives stated in both the FOWP (E & E 1994c) and the FOWP/QAPjP (E & E 1994d). A detailed discussion of the ESI objectives that were accomplished is presented in the following sections.

4.2 Quality Assurance/Quality Control Samples

Quality assurance samples included field duplicate samples, field blank samples, field equipment rinsate blank samples, and trip blank samples. In total, six groundwater and two soil field duplicate samples were collected; five equipment rinsate blank samples were collected following decontamination of the sampler; four field blank samples were collected during the soil gas sampling; and nine trip blank samples were shipped to the laboratory.

Quality control samples included one laboratory duplicate sample and twelve matrix spike/matrix spike duplicate (MS/MSD) samples.

4.3 Project-specific Data Quality Objectives

The laboratory data was reviewed to ensure that the data quality objectives (DQOs) for the project were met. The following describes the laboratory ability to meet the project DQOs for precision, accuracy, and completeness. In general, the laboratory was able to meet all DQOs for the project.

4.3.1 Precision

Precision measures the reproducibility of the sampling and analytical methodology. Laboratory and field precision is defined as the relative percent difference (RPD) between duplicate samples analyses. The laboratory duplicate samples or MS/MSD samples measure the precision of the analytical method and the field duplicate samples measure the precision of the field and analytical methods.

The RPD values were reviewed for all laboratory and field duplicate samples. The RPD values for the laboratory duplicate samples or MS/MSD samples were within laboratory QC criteria of less than 50%, except for one trichlorofluoromethane, 2-hexanone, and 1,2-dibromo-3-chloropropane outlier. The laboratory's QC limits were used to review the field

duplicate samples. The RPD values were within acceptable QC criteria for the field duplicate samples (see Tables 4-1 and 4-2). No data validation qualifier was applied to the QC outliers and the DOQs for precision were met.

4.3.2 Accuracy

Accuracy measures the reproducibility of the sampling and analytical methodology. Laboratory accuracy is defined as the surrogate spike percent recovery (%Rs) for each VOC analysis or the matrix %Rs of the spiked samples analyses. The surrogate %Rs values were reviewed for all VOC sample analyses. All %Rs were within acceptable laboratory QC criteria, except for 1,2-dichloroethane-d4 in samples 94244334, 94244336, and 94244344. A total of 17 results were flagged as estimated (UJ or J) based on surrogate recovery.

The matrix spike %Rs values were reviewed for all MS/MSD analyses. All MS percent recoveries were within acceptable laboratory QC criteria of greater than 50% and less than 150%, except for:

- One 2-hexanone %Rs,
- Two 1,2-dibromo-3-chloropropane recovery %Rs,
- Two naphthalene %Rs,
- Six 1,2,3-dichlorobenzene %Rs,
- Five 1,2,4-dichlorobenzene %Rs,
- Two hexachlorobutadiene %Rs,
- Two carbon disulfide %Rs,
- Two cis-1,3-dichloropropene %Rs,
- Two trans-1,3-dichloropropene %Rs,
- Four dichlorodifluoromethane %Rs,
- Two 2-butanone %Rs,
- One trichlorofluoromethane %Rs, and

- Two 1,2,3-trichloropropane %Rs.

Eleven sample results were flagged as estimated (UJ or J) based on MS/MSD recovery. A trichlorofluoromethane result was flagged as unusable (R) based on MS/MSD recovery. A total of 29 results, less than 1% of the data, was qualified based on laboratory accuracy. Overall the project DQO for accuracy were met.

4.3.3 Completeness

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). All laboratory data was reviewed for data validation and usability. Less than 1% of the data were determined to be unusable; therefore, the project DQO for completeness of 90% were met.

4.4 Laboratory and Field QA/QC Parameter

The laboratory data was also reviewed for holding times, laboratory blank samples, field equipment rinsate blank samples, field blank samples, and trip blank samples. These QA/QC parameters are summarized below. In general, the laboratory and field QA/QC were considered acceptable.

4.4.1 Holding Times

All sample analyses met EPA Region 10 holding time criteria.

4.4.2 Laboratory Blanks

All laboratory blanks met frequency criteria. Any associated sample result less than five times the blank contamination (ten times for common laboratory contaminants) were qualified as undetected (U). The following sample results were qualified based on blank contamination: acetone, carbon disulfide, methylene chloride, 2-butanone, chloroform, benzene, and toluene in sample 94384492; acetone, carbon disulfide, methylene chloride, benzene, and naphthalene in sample 94384502; acetone, carbon disulfide, methylene chloride, benzene, and toluene in sample 94394364; acetone, methylene chloride, 2-butanone, and benzene in sample 94394362; methylene chloride and chlorobenzene in sample 94394367; methylene chloride in samples

94394368 and 94394493; methylene chloride, 2-butanone, and toluene in sample 94394370; acetone, methylene chloride, chloromethane carbon disulfide and bromomethane in sample 94394351; and naphthalene in sample 94504426.

4.4.3 Field Equipment Rinsate Blanks

No contaminants of concern were detected in the field equipment rinsate blank samples except for trichloroethene in one rinsate blank sample at a concentration of 0.24 µg/L and 1,2-dichloroethane, 4-methyl-2-pentanone, 2-hexanone, 2-propanone, carbon tetrachloride, and chlorobenzene in another field rinsate blank at concentrations of 0.45 µg/L J, 2.0 µg/L J, 3.8 µg/L, 69.9 µg/L J, 0.033 µg/L J, and 0.1 µg/L respectfully. Any associated sample result less than five times the blank contamination (ten times for common laboratory contaminants) should be considered estimated due to possible cross-contamination. No action was taken, since the affected data was either greater than five times the blank results, not detected in the sample, or already qualified as estimated.

4.4.4 Field Blanks

No contaminants of concern were detected in the field blank samples.

4.4.5 Trip Blanks

No contaminants of concern were detected in the trip blank samples except for 1,2-dichloroethane in seven trip blank samples, toluene in three trip blank samples, 4-methyl-2-pentanone in five trip blank samples , 2-hexanone in two trip blank samples, 2-propanone in one trip blank sample, 1,2-dimethylbenzene in one trip blank sample, and total xylene in one trip blank sample. Any associated sample result less than five times the trip blank contamination (ten times for common laboratory contaminants) should be considered estimated due to possible cross-contamination. Toluene in sample 94414551 and 1,2-Dichloroethane in samples 94504436 and 94504422 were below five times the associated rinsate blank sample result and should be considered as estimated.

Table 4-1

RESULTS OF GROUNDWATER FIELD DUPLICATE SAMPLES
EPA REGION 10 LABORATORY
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample #	94244348	94244349	94394365	94394365D	94394366	94394366D
Matrix	Water	Water	Water	Water	Water	Water
1,1,1-Trichloroethane	1.0 U	1.0 U	NA	NA	NA	NA
1,1-Dichloroethane	1.0 U	1.0 U	NA	NA	NA	NA
1,2-Dichloroethane	1.0 U	1.0 U	NA	NA	NA	NA
Chlorobenzene	1.0 U	0.15 J	NA	NA	NA	NA
4-Methyl-2-pentanone	1.0 U	1.0 U	NA	NA	NA	NA
Chloroform	1.0 U	1.0 U	NA	NA	NA	NA
Dichloromethane	1.0 U	1.0 U	NA	NA	NA	NA
Tetrachloroethene	1.0 U	1.0 U	NA	NA	NA	NA
Trichloroethene	1.0 U	1.O U	0.3 J	1.0 U	1.0 U	1.0 U
Sample #	94394371	94394371D	94404422N	94404422P	94504421	94504422
Matrix	Water	Water	Water	Water	Water	Water
1,1,1-Trichloroethane	NA	NA	NA	NA	10.0 U	0.12 J
1,1-Dichloroethane	NA	NA	NA	NA	10.0 U	0.059 J
1,2-Dichloroethane	NA	NA	NA	NA	10.0 U	0.59 J
Chlorobenzene	NA	NA	NA	NA	10.0 U	10.0 U
4-Methyl-2-pentaanone	NA	NA	NA	NA	10.0 U	0.18 J
Tetrachloroethene	NA	NA	NA	NA	10.0 U	0.15 J
Trichloroethene	1.0 U	1.0 U	1.0 U	1.0 U	160	153

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected at or above the reported result.
µg/L - Micrograms per liter of water

NA - Not analyzed.

Table 4-2

RESULTS OF SOIL FIELD DUPLICATE SAMPLES
EPA REGION 10 LABORATORY
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample #	94394364	94394364D	94234752	94234753
Matrix	Soil	Soil	Soil	Soil
1,1-Dichloroethene	0.95 F	0.52 F	0.97 U	0.81 U
trans-1,2-Dichloroethene	0.2 NJF	0.5 UF	0.97 U	0.81 U
1-Methylethylbenzene	NA	NA	0.16 J	0.092 J
1,2,4-Trimethylbenzene	NA	NA	2.8 J	1.5 J
1,3,5-Trimethylbenzene	NA	NA	1.4 J	0.88 J
Propylbenzene	NA	NA	0.63 J	0.38 J
4-Methyl-2-pentanone	NA	NA	0.97 U	0.76 J
Tetrachloroethene	NA	NA	0.29 J	0.15 J
Trichloroethene	22.8	22.7	1.7	0.88

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected at or above the reported result.

NA - Not analyzed.

5. SOURCE SAMPLING

This section summarizes historical data and data collected during the ESI from the seven potential sources of TCE identified in Section 2.

5.1 SOURCE DESCRIPTIONS, SAMPLE LOCATIONS, AND ANALYTICAL RESULTS

Based on preliminary investigations discussed in Section 2 and information acquired during the ESI, seven potential source areas were chosen for further investigation and sampling during Phase I field activities of the ESI. These potential source areas are: Deming Industries; Advanced Input Devices; the former IDOT Maintenance facility on Government Way; the current IDOT facility on Ramsey Road; the Kootenai County Ramsey Road landfill; Interstate Concrete and Asphalt; and the Park Avenue/Dalton Avenue area (includes the Former Asphalt Batch Plant and GTE). The locations of these potential sources are shown in Figure 5-1. History, sampling activities, and analytical results for these potential source areas are presented in the following subsections.

5.1.1 Deming Industries

History

Deming Industries is located at 2945 Government Way, at 47°42'14" North latitude and 116°47'10" West longitude. The Deming Industries site map is presented in Figure 5-2. The EPA conducted an investigation of Deming Industries in December 1984 to investigate allegations from former employees that liquid wastes from various processes, including TCE,

were discharged into an on-site drainfield and onto the ground. The following information was presented in the final report generated for this investigation (E & E 1985).

The facility began operations in 1955 as Deming Machine and Supply Company. Deming Machine evolved into Deming Industries, a metal plating and painting facility, in about 1968 to 1970. At that time, the company installed a drainfield system on the west side of the property that consisted of a large septic tank connected by pipes to six drywells. From 1970 to 1975 liquid wastes from plating operations were discharged directly into the ground through the drainfield system. Former employees alleged that the company disposed of various liquid hazardous wastes from their processes on the site by discharging to the ground using the drainfield system and by the direct dumping and/or burial of the wastes on site. The waste stream consisted of sulfuric acid, nitric acid, cyanide solutions, chromic acid, TCE, and plating solutions containing zinc, copper, and silver. The EPA report stated that the estimated quantity of TCE disposed to the drainfield or to the ground may have been 600 to 800 gallons per year (E & E 1985).

After 1975 the company began discharging its wastewater into the Coeur d'Alene Wastewater Treatment Plant sewer system.

In 1980 operations were transferred from the old building on the southwest corner of the site to the presently used building. The old building was subsequently removed. The area is now covered with a concrete slab. The area north of the old building served as an automobile junk yard from the mid-1940s until the late 1970s. Deming acquired this property in 1979.

From 1955 to 1979, the west end of the new electroplating facility was operated as a diesel truck maintenance shop. Wastes were allegedly disposed onto the ground near the entrance to this shop. This shop was converted to a painting operational area in 1979. The plating processes (including degreasing, plating, and anodizing) are performed on the south half of the building. Cleaning solutions and many of the plating solutions are mixed with rinse water, pH adjusted, diluted with cooling process water, and discharged to the city sewer from a line located on the south side of the building (E & E 1985).

During the 1984/1985 sampling activities, several boreholes were drilled in the area of the drainfield and soil samples were collected. Samples also were collected from the contents of a septic tank located on the south side of the property, and from soil in the area of the

secondary drywell. The types of chemicals used at the Deming facility in the plating shop and paint shop were detected in the septic tank and to a lesser degree in the secondary drywell. The contents of the septic tank included trichloroethene (113,000 parts per billion [ppb]), tetrachloroethene (26,000 ppb), and trans-1,2-dichloroethene (10,800 ppb). Other VOCs detected in the septic tank included methylene chloride (3,970 ppb), acetone (41,700 p-pb), and 2-butanone (37,250 ppb). Soil collected from a borehole located immediately north of the secondary drywell also contained low levels of VOCs similar to those detected in the septic tank.

During an EPA investigation conducted by the TAT in November 1993, the sewer pipe from Deming was noted to be corroded and broken near the location where the sewer joins with the main on Anton Street. A soil sample collected by IDEQ near the break in the winter of 1993 did not contain VOCs. Deming's sewer line was then reconnected.

ESI Activities

Eighteen soil gas and seven subsurface soil samples were collected with the Geoprobe™ at eight locations near the drainfield of the drywell system of Deming Industries. Samples were collected from locations near the corroded sanitary sewer drainline on the south side of the property, the primary and secondary drywells, the former drum storage area (allegedly a TCE disposal location), and other drainfield drywells. No samples were collected from beneath the present facility or the concrete slab of the old facility.

Sample locations are presented in Figure 5-3. In addition to the samples collected on the Deming Industries property, three soil gas samples were collected from the Cosgrove Avenue right-of-way, approximately one block north (downgradient) of Deming Industries. Soil gas samples were analyzed in the ESAT field laboratory for 1,1-DCE, cis- and trans-1,2-DCE, and TCE. Subsurface soil samples and two soil gas confirmation samples were analyzed by EPA Region 10 laboratory for volatile organics (EPA Method 8240). Analytical results of the soil gas and subsurface soil sampling are presented in Figures 5-4 and 5-5 and Tables 5-1 through 5-3.

Field analysis of soil gas samples resulted in the detection of cis 1,2-DCE (estimated 0.12 μg/L) and TCE (estimated 0.012 μg/L) in sample 94234754 (DM03 at 5 feet BGS) and

1,1-DCE (estimated 0.06 μg/L) in sample 94234774 (DM08 at 6 feet BGS). Unidentified compounds with retention times similar to 1,1-DCE and vinyl chloride also were detected in the soil gas throughout the former drainfield. No TCE or its breakdown products were detected in soil gas samples collected from Cosgrove Avenue.

Soil gas confirmation samples were collected from two locations: sample 94244330 (DM03 at 5 feet BGS) was collected to confirm the results of sample 94234754; and sample 94244331 (DM06 at 12 feet BGS) was collected to confirm the results of unidentified compounds in sample 94234764. Sample 94244330 confirmed the presence of TCE at an estimated concentration of 61 μg/L, and cis-1,2-DCE at an estimated concentration of 0.15 μg/L. This sample also contained trans-1,2-DCE at an estimated concentration of 0.018 μg/L. Additional CAH compounds detected are 1,1,1-TCA and PCE, detected at estimated concentrations of 0.016 μg/L and 21 μg/L, respectively.

Sample 94244331 contained cis-1,2-DCE (estimated 0.056 μg/L) and TCE (estimated 29 μg/L), which were not detected in the field-analyzed sample. This sample also contained 1,1,1-TCA and PCE at estimated concentrations of 0.01 μg/L and 6.8 μg/L, respectively.

Several other chlorinated compounds also were detected in the confirmation samples, including: carbon tetrachloride; chloroform; dichlorodifluoromethane; and trichlorofluoromethane. Aromatic compounds detected in the samples included: benzene; toluene; 1,2-dimethylbenzene (o-xylene); m & p-xylene; ethylbenzene; and 1,2,3-trimethylbenzene. 4-methyl-2-pentanone also was detected.

Seven subsurface soil samples were collected from five sample locations throughout the Deming Industries drainfield. TCE was detected in all samples at concentrations ranging from an estimated 0.66 μg/kg (DM04 at 10 feet BGS) to 55 μg/kg (DM06 at 10 feet BGS). Cis-1,2-DCE was detected in one sample (DM06 at 10 feet BGS) at an estimated 0.079 μg/kg. PCE was detected in all samples at concentrations ranging from 0.15 μg/kg (estimated) to 88 μg/kg. Other compounds detected in all soil samples include: 1,3,5-trimethylbenzene (ranging from an estimated 0.23 μg/kg [DM03 at 9 feet BGS] to an estimated 1.4 μg/kg [DM02 at 9 feet BGS]; and 1,2,4-trimethylbenzene (ranging from an estimated 0.43 μg/kg [DM03 at 9 feet BGS] to an estimated 2.8 μg/kg [DM02 at 9 feet BGS]). In addition, 1-methylethylbenzene was detected at DM02 at 9 feet BGS at an

estimated 0.16 μg/kg; propylbenzene was detected at DM02 at 9 feet BGS and DM04 at 10 feet BGS at an estimated 0.63 μg/kg and 0.39 μg/kg, respectively; and 4-methyl-2-pentanone was detected at DM02 at 9 feet BGS and DM03 at 9 feet BGS at an estimated 0.76 μg/kg and an estimated 1.3 μg/kg, respectively.

In general, sampling indicated TCE contamination in soils throughout the former drainfield, with the greatest concentration at location DM06 (the location of the secondary drywell). The highest concentrations of cis-1,2-DCE and PCE also were detected at this location. 1,2,4- and 1,3,5-trimethylbenzene also were detected throughout the former drainfield, with the greatest concentrations located at DM02 (the location of the break in the sanitary sewer drain). Propylbenzene and 1-methylethylbenzene also were detected at this location. Additional locations of contamination that were not investigated include the old facility location on the SE corner of the property, currently a concrete slab, and the south side of the current building, where the electroplating processes are located.

On March 10, 1995, a sludge sample was collected from the presently unused septic tank at Deming Industries by Deming Industries, as overseen by IDEQ. The sludge sample was collected from the septic tank following excavation of the soil overburden. A split sample was taken for EPA and submitted to EPA's Region 10 laboratory for analyses. Analytical results are included in Appendix D.

5.1.2 Advanced Input Devices

History

Advanced Input Devices is a manufacturer of electronic keyboards and other equipment. It is located on W. 250 AID Drive in Dalton Gardens to the north of Coeur d'Alene at 47°44'12" North latitude and 116°47'19" West longitude. According to information in EPA files, past practices at Advanced Input Devices allegedly included discharge of unspecified solvents in the area behind the process building (EPA 1994). The Advanced Input Devices site map is presented in Figure 5-6.

The following information was obtained from documents received from Mike Arnold, Advanced Input Device's Environmental Coordinator. Samples were collected in 1987 in the area of the receiving dock at the south side of the building in response to a consent order

issued by the State of Idaho Department of Health and Welfare Hazardous Materials Bureau, because of hazardous materials leaching into the soil. Three boreholes were drilled and soil samples were collected at depths up to 9 feet BGS. Samples were analyzed for acetone, methyl ethyl ketone, freon TF, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and toluene. Results were negative to a detection limit of 0.1 ppm for the trichloroethanes and the toluene, and to 1 ppm for the acetone, methyl ethyl ketone and freon TF (Reidel 1987).

An underground solvent storage tank was removed from the south side of the building in 1993. The tank was used from 1980 to 1983 for the temporary storage of spent solvents from the silkscreening process. A sample of the residue from the bottom of the tank indicated the presence of 1,1-DCE and methylene chloride. Soil collected from the bottom of the excavation did not contain detectable levels of VOCs, and no signs of damage or leakage were apparent in the tank or the surrounding soils (JUB 1993).

In November 1993, EPA tasked E & E's Technical Assistance Team to conducted an investigation of Advanced Input Devices that included the collection of soil gas samples with the Geoprobe™. Two samples were collected in the vegetated parking area behind the paved parking area on the south side of the property. These locations were not considered optimal, but were chosen because of the presence of underground utility lines nearer to the building. TCE was not detected in the soil gas samples.

A soil sample also was collected from the east sump. Laboratory analysis did not indicate the presence of chlorinated solvents or degradation products.

ESI Activities

Nineteen soil gas samples, three subsurface soil samples, one sump water sample, and one sump sludge sample were collected from nine locations. Sample locations are presented in Figure 5-7. Soil gas samples and a water sample from the east sump were analyzed in the ESAT field laboratory for 1,1-DCE, cis- and trans-1,2-DCE, and TCE. Three subsurface soil samples, one sludge sample from the west sump, and two soil gas confirmation samples were analyzed at the EPA Region 10 laboratory for volatile organics (EPA Method 8240). Analytical results of the soil gas and subsurface soil sampling are presented in Figure 5-8 and Tables 5-4 through 5-6.

Trans-1,2-DCE in soil gas was the only target compound detected during field analysis of samples collected from Advanced Input Devices. Trans-1,2-DCE (greater than 3.4 μg/L) was detected in soil gas sample 94234777, collected from a location approximately six feet southwest of the west sump (AI02 at 6 feet BGS). Trans-1,2-DCE (estimated 0.07 μg/L) also was detected in soil gas sample 94234780, collected adjacent to the south side of the building (AI03 at 12 feet BGS).

Soil gas and subsurface soil confirmation samples were collected from two locations near the west sump. Samples 94244336 (soil gas) and 94244335 (soil) were collected to confirm the results of 94234777 (AI02 at 6 feet BGS) and samples 94244334 (soil gas) and 94244333 (soil) were collected to identify unknown compounds detected in sample 94234775 (AI01 at 6 feet BGS). Sample 94244336 (soil gas at AI02 at 6 feet BGS) did not confirm the presence of trans-1,2-DCE. However, it did contain TCE at 0.056 μg/L, as well as PCE at 0.032 μg/L and 1,1,1-TCA at an estimated 0.0038 μg/L. In addition, it contained low levels of dichlorodifluoromethane, xylenes, and toluene. The soil sample from this location (94244335) did not contain any CAH compounds; however, it contained low levels of 1-methylethylbenzene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene.

Sample 94244334 (soil gas at AI01 at 6 feet BGS) contained 1,1,1-TCA at an estimated concentration of 0.0089 μg/L, as well as several other chlorinated compounds, including: 1,1,1-trichloroethane, 1,2,3-trichlorobenzene; and hexachlorobutadiene. The sample also contained aromatic compounds, including: xylenes; 1,2-dimethylbenzene; ethylbenzene; 1,2,4-trimethylbenzene; and 1,3,5-trimethylbenzene. The soil sample collected from the same location (94244333) did not contain any detectable VOCs.

No CAH compounds were detected in samples collected from the east drywell and west sump. The west sump sludge sample (94234701) contained the aromatic compounds that were detected in the soil gas sample from AI01. In addition, the sample contained toluene; 1-methylethylbenzene; 1-methyl-4-(1-methyl)benzene; propylbenzene; and toluene. The sludge sample also contained 2-propanone and 2-butanone. A subsurface soil sample collected directly adjacent to the sump (94234702) contained most of the same aromatic compounds, but at lower concentrations. The water sample collected from the east drywell was analyzed

in the field laboratory and did not contain TCE or its breakdown products above the detection limit of 1 μg/L.

5.1.3 Former Idaho Department Transportation Maintenance Facility

History

The former IDOT Maintenance Facility is located at 224 Ironwood, Coeur d'Alene, Idaho. It is located at 47°40'40" North latitude and 116°47'23" West longitude. The property has been redeveloped by First Western Development of Bellevue, Washington, and consists of a grocery store, a drug store, and several retail shops. The site as it exists currently is presented in Figure 5-9.

Under IDOT ownership, the site was used as a truck maintenance shop. IDOT occupied the site from the early 1940s until November 1990. Degreasing operations were performed in a parts washer using petroleum distillate, which was collected for reclamation. IDOT also generated paint chips by cleaning large road-marking stencils with toluene. It is possible that TCE was used for degreasing and cleaning activities (EPA 1994).

The redevelopment of the site was conducted in three phases. Phase I included the construction of an Albertson's and several small shops on the western half of the property. Phase II included demolition of the truck maintenance shop and construction of buildings west of the Albertson's. Phase III will include development of the remaining lots on the east side of the property (EPA 1994).

Remedial activities were conducted in 1991, prior to the Albertson's construction, with the assistance of IDEQ. Phase I activities revealed that 16 dry wells existed on the property, installed to depths ranging from approximately 3.5 to 18 feet BGS and cased with 55-gallon drums (CH_2M 1989b). The shop's floor drains ran to the dry wells, which were used for dumping oil (EPA 1994). The drywells were eventually removed.

TCE was detected in two of 15 samples collected during the drilling of 12 soil borings at concentrations of an estimated 0.6 μg/kg and 3.0 μg/kg. These samples were located at the south side of the property, behind the present Albertson's building at depths of 0 to 5 feet BGS (CH_2M 1989a). The main contaminant of concern during remediation was TPH;

therefore, soil throughout the site was excavated to a point where analyses indicated less than 1,000 ppm total petroleum hydrocarbons.

IDEQ drilled a well approximately 100 feet downgradient from the area of major contamination (north of the current Albertson's location) to the depth at which water was encountered (172 feet BGS). Groundwater did not contain detectable levels of VOCs. In addition, a soil sample collected at 70 feet BGS during drilling did not contain detectable levels of VOCs (CH_2M 1989b). Albertson's then required that the well be abandoned (EPA 1994).

ESI Activities

Sixteen soil gas and three subsurface soil samples were collected from seven locations at the Former IDOT Maintenance Facility with the Geoprobe™. Sample locations are shown in Figure 5-10. Soil gas samples were analyzed in the ESAT field laboratory for 1,1-DCE, cis- and trans-1,2-DCE, and TCE. Three subsurface soil samples and one soil gas confirmation sample were analyzed by EPA Region 10 laboratory for volatile organics (EPA Method 8240). Analytical results of the field and fixed laboratory analyses are presented in Figure 5-11 and Tables 5-7 and 5-8.

Field analysis of the soil gas samples did not detect TCE or its breakdown products, although it did indicate the probable interference in samples collected site-wide of a compound with a retention time overlapping that of 1,1-DCE. Several additional compounds also were detected at sample locations AL02 and AL03, but were not identifiable because the field laboratory was analyzing for specific analytes.

Soil gas confirmation sample, 94244341 (AL02 at 6 feet BGS) indicated low concentrations of 1,1,1-TCA (0.10 μg/L) and PCE (0.013 μg/L, estimated). The sample also contained other chlorinated compounds, including 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, carbon tetrachloride, hexachlorobutadiene, dichlorodifluoromethane, and trichlorofluoromethane.

Soil samples were collected from locations AL02 and AL03. No soil samples were collected from other locations. VOCs were not detected in the soil samples collected from

location AL02 (94244339 and 94244340 [duplicate]) or from a soil sample collected to the east, at location AL03 (94244342).

No TCE or its breakdown products were detected in samples collected from the Former IDOT facility, although CAH compounds 1,1,1-TCA and PCE were detected at low concentrations.

5.1.4 IDOT Maintenance Facility - Ramsey Road

History

The current IDOT Maintenance Facility is located at 2902 Ramsey Road, Coeur d'Alene, Idaho at 47°42'9" North latitude and 116°47'56" West longitude. IDOT has operated at this location since 1946. The site is used for miscellaneous highway maintenance materials and hazardous materials storage. Maintenance-related solvents, including TCE, may have been used on site (EPA 1994).

The site map is presented in Figure 5-12. The site contains large excavations for road gravel and fill on most of the north and west sides of the site. Equipment storage is on the southeast corner of the lot. An approximately 5,000-square-foot, fenced, hazardous materials storage area is located near the center of the property on a sand and visquene surface. A former hazardous materials storage area is located adjacent to it. Five bulk storage tanks used for paint and road oil are located near the southwest corner of the site (EPA 1994).

ESI Activities

Twelve soil gas and one subsurface soil sample were collected from six locations at the current IDOT Maintenance Facility with the Geoprobe™. In addition, four soil gas and one subsurface soil sample were collected on the Ramsey Road right-of-way adjacent to the property. Sample locations are shown in Figure 5-13. Soil gas samples were analyzed in the ESAT field laboratory for 1,1-DCE, cis- and trans-1,2-DCE, and TCE. Two subsurface soil samples and two soil gas confirmation samples were analyzed by EPA Region 10 laboratory for volatile organics (EPA Method 8240). Analytical results of the field and fixed laboratory analyses are presented in Figure 5-14 and Tables 5-9 and 5-10.

Neither TCE nor its breakdown products were detected in soil gas analyzed at the ESAT field laboratory. However, sample 94234730, collected from the Ramsey Road right-of-way (RA01 at 12 feet BGS), contained large peaks of unidentified compounds that masked the target compounds and saturated the detector. Other unknown compounds with retention times overlapping those of 1,1-DCE and trans-1,2-DCE were detected in several samples.

A soil gas confirmation sample (94244344) and a subsurface soil sample (94244343) were collected from the location on Ramsey Road in which large peaks over the target compounds were noted in the field results (RA01 at 12 feet BGS). The soil gas confirmation sample contained PCE at an estimated concentration of 0.0034 μg/L, as well as low levels of several aromatic compounds, including: xylenes; toluene; 1,2-dimethylbenzene; ethylbenzene; propylbenzene; styrene; 1,2,4- and 1,3,5-trimethylbenzene; trichlorofluoromethane; dichlorofluoromethane; and 1,4-dichlorobenzene. Dichlorofluoromethane and trichlorofluoromethane were detected at the highest concentrations of all analytes detected, at approximately 0.65 μg/L and approximately 0.026 μg/L, respectively. The subsurface soil sample collected from the same location did not contain detectable concentrations of VOCs.

A soil gas confirmation sample (94244346) and a subsurface soil sample (94244345) also were collected from a location on site (94244346, DT05 at 12 feet BGS). The soil gas confirmation sample contained small quantities of TCE (0.017 μg/L, estimated), 1,1,1-TCA (0.011 μg/L, estimated), and PCE (0.0078 μg/L, estimated), as well as many of the same contaminants as the sample collected from Ramsey Road. The collocated soil sample did not contain detectable concentrations of contaminants.

5.1.5 Kootenai County Landfill - Ramsey Road

History

The Kootenai County landfill is located at 3650 North Ramsey Road, at 47°42'19" North latitude and 116°48'23" West longitude. The property has been used as a landfill since the 1960s by both the City of Coeur d'Alene and Kootenai County. The site consists of the old landfill on the west side of Ramsey Road and the current landfill on the east side of Ramsey Road. The old landfill is closed and is bounded on the west by residential development. The northern part of the old landfill has been converted into Ramsey Park. The new landfill is in

the process of closing, and consists of the inactive southern part and the active northern part. The site map is presented in Figure 5-15.

Both landfills are unlined. The new landfill is undergoing closure and has been covered with a liner and seeded. The new landfill contains a methane sampling/extraction system consisting of alternating gas extraction wells and probes for sampling every 100 feet around the perimeter of the new landfill. Older gas sampling probes also are located on the west edge of the old landfill, adjacent to the housing development. The county monitors the methane from the probes quarterly. Currently they extract 550 cubic feet of methane from the landfill daily (Wolfe 1994).

ESI Activities

Twelve soil gas and one groundwater sample were collected from six locations at the current and former Kootenai County landfills from existing methane sampling probes. In addition, five soil gas samples were collected on the Ramsey Road right-of-way adjacent to the landfill with the Geoprobe™. Sample locations are shown in Figure 5-16. Soil gas samples and the water sample were analyzed in the ESAT field laboratory for 1,1-DCE, cis- and trans-1,2-DCE, and TCE. One soil gas confirmation sample was analyzed by EPA Region 10 laboratory for VOCs (EPA Method 8240). Analytical results of the field and fixed laboratory analyses are presented in Figure 5-17 and Tables 5-11 and 5-12.

Neither TCE nor its breakdown products were detected in soil gas samples or the water sample analyzed in the ESAT field laboratory. However several samples contained unknown compounds with retention times overlapping 1,1-DCE and trans-1,2-DCE. One sample collected from the Ramsey Road right-of-way (94234734, RA04 at 12 feet BGS) contained a high concentration of compounds which masked the target compounds and saturated the detector, similar to the sample collected from Ramsey Road adjacent to the IDOT facility.

A soil gas confirmation sample (94244332) was collected from the deepest sampling port, believed to be located in the most downgradient position (LF02 at 58 feet BGS). A low concentration of TCE was detected (estimated 0.04 μg/L). 1,1,1-TCA and PCE were also detected at low concentrations (estimated at 0.0030 μg/L and 0.025 μg/L, respectively). The highest concentrations of VOCs in this sample were for dichlorodifluoromethane and

trichlorofluoromethane, as seen in the upgradient sample collected near the IDOT facility. The following compounds also were detected in low concentrations: 2-butanone, carbon disulfide, and chloroform.

5.1.6 Interstate Concrete and Asphalt

History

Interstate Concrete and Asphalt is located at 845 Kathleen Avenue at 47°43'10.4" North latitude and 116°47'43" West longitude. No information was available on this site in the EPA CERCLIS site file; however, during the Phase I sampling activities, an anonymous communication alleging that solvents may have been used and improperly disposed of at the facility's truck washing operations was received. The site map is presented in Figure 5-18. The site contains a truck washing area located north of the facility office building, consisting of a concrete pad overlaying the soil. Most of the site consists of a large gravel pit. The current status of the site is presented in Figure 5-18.

ESI Activities

Six soil gas samples were collected from three locations at the Interstate Concrete and Asphalt facility using the Geoprobe™, including a sample collected in the gravel pit down-gradient and at approximately 110 feet below grade (94244885, IC02 at 60 feet BGS). Sample locations are shown in Figure 5-19. Soil gas samples were analyzed in the ESAT field laboratory for 1,1-DCE, cis- and trans-1,2-DCE, and TCE. Analytical results of the field laboratory analyses are presented in Table 5-13.

Neither TCE nor its breakdown products were detected in the soil gas samples. Furthermore, no interferences or undetected compounds were observed during analysis. Therefore, confirmation soil gas and subsurface soil samples were not collected.

5.1.7 Park Avenue/Dalton Avenue Area

History

The area and the facilities comprising the Park Avenue/Dalton Avenue area are presented in Figure 5-20. Two of the original 26 EPA sites are located within this area: the Former Asphalt Batch Plant and the GTE Garage.

GTE operated a vehicle maintenance building from 1979 to 1991. A former waste oil UST was located on the eastern side of the on-site building and was removed in 1991 with no evidence of leakage. Approximately 8 cubic yards of stained surface soil throughout the site, contaminated with fuel hydrocarbons, was removed. The only solvent reportedly used on site was a Safety Kleen Solvent that was continually recycled by Safety Kleen (EPA 1994).

The former Asphalt Batch Plant is currently not occupied. A metal building with a concrete floor and a wooden storage shed remain on site (EPA 1994). The site reportedly contained buried drums. The EPA investigated the site in November 1993 and conducted an electromagnetic survey over the site, but no drums were discovered. Soil gas and subsurface soil samples were collected during the November 1993 investigation from areas within the Former Asphalt Batch Plant property and on Park Avenue right of way north (downgradient) of the site; however, TCE was not detected (E & E 1994).

Panhandle Concrete also is located between Park and Dalton Avenues. The property has been gravel mined to approximately 25 to 30 feet BGS, and is presently used for the fabrication and storage of concrete products.

A former borrow pit, a reported dumping area, is located on the north side of Park Avenue, approximately in the area of the current residential development at Silverpine Court. Another reported dumping area is located south of Dalton Avenue, across from Panhandle Concrete.

According to records in the EPA file, a release of an aboveground petroleum tank may have occurred on the north side of Dalton Avenue, near the driveway to Panhandle Concrete.

ESI Activities

Fourteen soil gas samples were collected from eight locations throughout the Park Avenue and Dalton Avenue area. Sample locations are shown in Figure 5-21. Soil gas samples were analyzed in the ESAT field laboratory for 1,1-DCE, cis- and trans-1,2-DCE,

and TCE. One confirmation soil gas sample and one subsurface soil sample were collected and analyzed for VOCs (EPA Method 8240) at EPA Region 10 laboratory. Analytical results of the field and fixed laboratory analyses are presented in Tables 5-14 and 5-15.

Neither TCE nor its breakdown products were detected in the soil gas samples analyzed by the ESAT field laboratory. However, one sample collected from the Dalton Avenue right-of-way (94234798, DA01 at 27 feet BGS) contained compounds that masked the peaks of the target compounds and saturated the detector. A confirmation soil gas sample was collected from this location (94244338). Collection of a collocated subsurface soil sample was attempted; however, the deepest soil sample that could be collected was at 6 feet BGS (94244337). The soil gas confirmation sample contained PCE at an estimated concentration of 0.013 μg/L, as well as dichlorofluoromethane, trichlorofluoromethane, and the following aromatic compounds: benzene; xylenes; toluene; naphthalene; 1,2-dimethylbenzene; ethylbenzene; propylbenzene; and 1,2,4-trimethylbenzene. No contaminants were detected in the subsurface soil sample above the detection limits. Most of these compounds may be the result of contamination from a release from an aboveground storage tank located nearby.

5.2 SUMMARY

Soil gas samples were collected from each of the potential source locations investigated during Phase I field activities. Based primarily upon the results of soil gas samples analyzed at the ESAT field laboratory (FASP), confirmation soil gas and soil sample locations were selected. Field and/or confirmation samples collected from the following potential source areas investigated during Phase I field activities contained TCE: Deming Industries (soil and soil gas); Advanced Input Devices (AID) (soil gas); the current IDOT maintenance facility on Ramsey Road (soil gas); and the Kootenai County Landfill on Ramsey Road (soil gas). PCE was also detected in field and/or confirmation samples collected at the following potential source areas: Deming Industries (soil and soil gas); AID (soil gas); the former IDOT maintenance facility (soil gas); the current IDOT maintenance facility (soil gas); and the Kootenai County Landfill on Ramsey Road (soil gas). PCE was also detected in a confirmation soil gas sample collected from the Ramsey Road right of way adjacent to the current IDOT maintenance facility.

NOTE: PROBLEMS WITH PROCEDURES USED TO COLLECT AND ANALYZE THE SOIL GAS SAMPLES DURING PHASE I FIELD ACTIVITIES HAVE BEEN IDENTIFIED (APPENDIX A). PROBLEMS PERTAIN TO BOTH FIELD AND CONFIRMATION SOIL GAS SAMPLES COLLECTED BY ESAT AND ANALYZED AT BOTH THE ESAT FIELD LABORATORY (FASP) AND EPA REGION 10 LABORATORY DURING PHASE I FIELD ACTIVITIES. BASED UPON THESE PROBLEMS, IT HAS BEEN DETERMINED THAT THE PHASE I SOIL GAS ANALYTICAL RESULTS ARE NOT VALID. AT THE REQUEST OF EPA, THE PHASE I FASP SOIL GAS RESULTS ARE INCLUDED IN THIS REPORT FOR INFORMATIONAL PURPOSES. AVAILABLE INFORMATION SUGGESTS THAT THE CONFIRMATION SOIL GAS SAMPLE RESULTS PRESENTED HEREIN ARE BIASED LOW (APPENDIX A).

The concentrations of TCE and PCE were very low in all of the soil gas and/or soil samples except those collected at Deming Industries. Based upon the historical information and soil gas and soil sampling of the seven potential source areas investigated during Phase I field activities, Deming Industries appeared to be the most likely source of TCE in the Sunrise Terrace and City of Coeur d'Alene Hanley wells. On this basis, Deming Industries was the only area chosen in which to conduct further investigation, to include the installation of monitoring wells, during the second phase of field activities. It is noted, however, that low concentrations of PAH compounds were detected at other potential source areas investigated, and these areas cannot be ruled out as potential sources of TCE contamination.

Table 5-1

SOIL GAS SAMPLE FIELD ANALYTICAL RESULTS - DEMING INDUSTRIES/COSGROVE AVENUE
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	Sample Location	Depth (BGS)	1,1-DCE	trans-1,2-DCE	cis-1,2-DCE	TCE
94234750	DM01	4'	0.1 UF*	0.1 UF*	0.1 UF*	0.01 UF*
94234751	DM01	10'	0.1 UF*	0.1 UF*	0.1 UF*	0.01 UF*
94234754[b]	DM03	5'	0.1 UF*	0.1 UF*	0.12 F*	0.012 F*
94234755	DM03	10'	0.6[a] F*	0.1 UF*	0.1 UF*	0.01 UF*
94234763	DM06	6'	0.2 UF*	0.2 UF*	0.2 UF*	0.2 UF*
94234764[c]	DM06	12'	1.4[a] F*	0.2 UF*	0.2 UF*	0.2 UF*
94234765	DM06	28'	0.02 UF*	0.1 UF*	0.1 UF*	0.02 UF*
94234766	DM04	6'	0.02 UF*	0.1 UF*	0.1 UF*	0.02 UF*
94234767	DM04	12'	0.02 UF*	0.1 UF*	0.1 UF*	0.02 UF*
94234768	DM04	27'	0.02 UF*	0.1 UF*	0.1 UF*	0.02 UF*
94234769	DM02	6'	0.2 UF*	0.1 UF*	0.1 UF*	0.02 UF*
94234770	DM07	12'	0.9[a] F*	0.2 UF*	0.2 UF*	0.2 UF*
94234771	DM05	6'	0.02 UF*	0.1 UF*	0.1 UF*	0.02 UF*
94234772	DM05	12'	0.02 UF*	0.1 UF*	0.1 UF*	0.02 UF*
94234773	DM08	6'	0.06 F*	0.2 UF*	0.2 UF*	0.04 UF*
94234774	DM08	12'	0.02 UF*	0.1 UF*	0.1 UF*	0.02 UF*
94234790	CO01	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234791	CO01	31'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234792	CO01	31'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*

a - Probable interference with compound with overlapping retention time.
b - Confirmed at EPA Region 10 laboratory with sample number 94244330 (see Table 5-2).
c - Confirmed at EPA Region 10 laboratory with sample number 94244331 (see Table 5-2).
F - The "F" qualifier indicates the associated numerical value is an estimate due to the use of less-rigorous FASP methods.
U - The analyte was not detected. The associate numerical value is the sample detection limit.
µg/L - Micrograms per liter of water.
BGS - Below ground surface.
* **Note: Problems with procedures used to collect and analyze the soil gas samples during Phase I field activities have been identified. The problems include both field and confirmation soil gas samples collected by ESAT and analyzed at both the ESAT field laboratory (FASP) and EPA Region 10 laboratory during Phase I field activities. Based upon these problems, it has been determined that the Phase I soil gas analytical results are not valid. At the request of EPA, the Phase I FASP soil gas results are included in this report for informational purposes.**

Table 5-2

SOIL GAS CONFIRMATION SAMPLE ANALYTICAL RESULTS - DEMING INDUSTRIES
EPA REGION 10 LABORATORY
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	94244330	94244331
Sample Location	DM03	DM06
Depth (BGS)	5'	12'
Analyte		
4-Methyl-2-Pentanone	0.011 J*	0.03 U*
1,2-Dimethylbenzene	0.015 J*	0.037*
Ethylbenzene	0.01 J*	0.043*
Carbon Tetrachloride	0.0011 J*	0.03 U*
1,1,1-Trichloroethane	0.016 J*	0.01 J*
Benzene	0.038 U*	0.066 J*
1,2,4-Trimethylbenzene	0.032 J*	0.022 J*
Chloroform	0.018 J*	0.0085 J*
cis-1,2-Dichloroethene	0.15 J*	0.056 J*
Dichlorodifluoromethane	0.98 J*	0.14 J*
MP-Xylene	0.04 J*	0.20*
Toluene	0.061 J*	0.35 J*
Total Xylenes	0.055 J*	0.24*
Trichlorofluoromethane	0.0048 J *	0.0034*
Tetrachloroethene	21 J*	6.8 J*
trans-1,2-Dichloroethene	0.018 J*	0.03 U*
Trichloroethene	61 J*	29 J*

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected. The associate numerical value is the sample detection limit.
BGS - Below ground surface.
µg/L - Micrograms per liter of water.
* **Note: Problems with procedures used to collect and analyze the soil gas samples during Phase I field activities have been identified. The problems include both field and confirmation soil gas samples collected by ESAT and analyzed at both the ESAT field laboratory (FASP) and EPA Region 10 laboratory during Phase I field activities. Based upon these problems, it has been determined that the Phase I soil gas analytical results are not valid. At the request of EPA, the Phase I FASP soil gas results are included in this report for informational purposes.**

Table 5-3

SUBSURFACE SOIL ANALYTICAL RESULTS - DEMING INDUSTRIES
EPA REGION 10 LABORATORY
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/kg)

Sample Number	94234752	94234753	94234756	94234757	94234758	94234760	94234761
Location Number	DM02	DM02	DM04	DM05	DM06	DM03	DM03
Depth (BGS)	9'	9'	10'	10'	10'	5'	9'
Analyte							
4-Methyl-2-Pentanone	0.97 U	0.76 J	0.95 U	0.96 U	0.89 U	1.00 U	1.3 J
1-Methylethylbenzene	0.16 J	0.092 J	0.95 U	0.96 U	0.89 U	1.00 U	0.94 U
1,2,4-Trimethylbenzene	2.8 J	1.5 J	0.94 J	0.75 J	0.65 J	0.51 J	0.43 J
1,3,5-Trimethylbenzene	1.4 J	0.88 J	0.58 J	0.36 J	0.40 J	0.26 J	0.23 J
Propylbenzene	0.63 J	0.38 J	0.39 J	0.96 U	0.89 U	1.00 U	0.94 U
cis-1,2-Dichloroethene	0.97 U	0.81 U	0.95 U	0.96 U	0.079 J	1.00 U	0.94 U
Hexachlorobutadiene	0.97 U	0.81 U	0.95 U	0.96 U	2.7	1.00 U	0.94 U
Tetrachloroethene	0.29 J	0.15 J	0.16 J	0.21 J	88	1.0 J	0.38 J
Trichloroethene	1.7	0.88	0.66 J	1.2	55	2.2	0.74 J

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected. The associate numerical value is the sample detection limit.
µg/L - Micrograms per liter of water.
BGS - Below ground surface.

Table 5-4

SOIL GAS AND WATER SAMPLE FIELD ANALYTICAL RESULTS - ADVANCED INPUT DEVICES
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	Sample Location	Matrix	Depth (BGS)	1,1-DCE	trans-1,2-DCE	cis-1,2-DCE	TCE
94234775[a]	AI01	Soil gas	6'	0.96[b] F*	0.01 UF*	0.01 UF*	0.01 UF*
94234776	AI01	Soil gas	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234777[c]	AI02	Soil gas	6'	1.2[b] F*	>3.4[d] F*	NAR*	0.01 UF*
94234778	AI02	Soil gas	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234779	AI03	Soil gas	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234780	AI03	Soil gas	12'	0.01 UF*	0.07 F*	0.01 UF*	0.01 UF*
94234781	AI04	Soil gas	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234782	AI04	Soil gas	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234783	AI05	Soil gas	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234784	AI05	Soil gas	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234785	AI05	Soil gas	21'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234786	AI06	Soil gas	3'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234787	AI06	Soil gas	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234788	AI06	Soil gas	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234793	AI07	Soil gas	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234794	AI07	Soil gas	27'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234795	AI08 (beneath east sump)	Soil gas	5'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234716	AI08 (east sump)	Water		1 UF*	1 UF*	1 UF*	1 UF*

a - Confirmed at EPA Region 10 laboratory with sample number 94244334 (see Table 5-5).
b - Probable interference with compound with overlapping retention time.
c - Confirmed at EPA Region 10 laboratory with sample number 94244336 (see Table 5-5).
d - Large peak present over both cis- and trans-1,2-DCE.
F - The "F" qualifier indicates the associated numerical value is an estimate due to the use of less-rigorous FASP methods.
U - The analyte was not detected. The associate numerical value is the sample detection limitµg/L-Micrograms per liter of water.BGS-Below ground surface.
* Note: Problems with procedures used to collect and analyze the soil gas samples during Phase I field activities have been identified. The problems include both field and confirmation soil gas samples collected by ESAT a[illegible]nalyzed at both the ESAT field laboratory (FASP) and EPA Region 10 laboratory during Phase I field activities. Based upon these problems, i[illegible] been determined that the Phase I soil gas analytical results are not valid. At the request of EPA, the Phase I FASP soil gas results are included in this report for informational purposes.

Table 5-5

SOIL GAS CONFIRMATION SAMPLE ANALYTICAL RESULTS - ADVANCED INPUT DEVICES
EPA REGION 10 LABORATORY
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	94244334	94244336
Sample Location	AI01	AI02
Depth (BGS)	6'	6'
Analyte		
'1,2,3-Trichlorobenzene	0.0074 J*	0.032 U*
1,2-Dimethylbenzene	0.0086 J*	0.032 U*
Ethylbenzene	0.0061 J*	0.032 U*
1,1,1-Trichloroethane	0.0089 J*	0.0038 J*
1,2,4-Trimethylbenzene	0.025 J*	0.032 U*
1,3,5-Trimethylbenzene	0.0086 J*	0.032 U*
Dichlorodifluoromethane	0.091 U*	0.0064 J*
MP-Xylene	0.029 J*	0.0037 J*
Toluene	0.041 U*	0.011 J*
Total Xylenes	0.038 J*	0.0037 J*
Hexachlorobutadiene	0.091 J*	0.032 U*
Tetrachloroethene	0.091 U*	0.032*
Trichloroethene	0.091 U*	0.056*

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected. The associate numerical value is the sample detection limit.
µg/L - Micrograms per liter of water
BGS - Below ground surface.
* Note: Problems with procedures used to collect and analyze the soil gas samples during Phase I field activities have been identified. The problems include both field and confirmation soil gas samples collected by ESAT and analyzed at both the ESAT field laboratory (FASP) and EPA Region 10 laboratory during Phase I field activities. Based upon these problems, it has been determined that the Phase I soil gas analytical results are not valid. At the request of EPA, the Phase I FASP soil gas results are included in this report for informational purposes.

Table 5-6

SUBSURFACE SOIL AND SLUDGE SAMPLE ANALYTICAL RESULTS
ADVANCED INPUT DEVICES
EPA REGION 10 LABORATORY
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/kg)

Sample Number	94234701	94234702	94244333	94244335
Location Number	AI09	AI09	AI01	AI02
Matrix	West sump contents	Soil Adjacent to sump	Soil	Soil
Depth (BGS)		4'	6'	6'
2-Propanone	190 J	32.3 UJ	8.2 U	8.4 U
1-Methylethylbenzene	210	0.79 J	1.4 U	0.53 J
1,2-Dimethylbenzene	12.2 J	0.91 U	1.4 U	1.6 U
1-Methyl-4-(1-methyl)benzene	130	0.91 U	1.4 U	1.6 U
2-Butanone	8.2 J	1.9 U	2.7 U	3.1 U
1-Methylpropylbenzene	160	0.74 J	1.4 U	1.6 U
1,2,4-Trimethylbenzene	2,500	15.4 J	1.4 U	5.4
1,3,5-Trimethylbenzene	1,700	6.6 J	1.4 U	12.3
Propylbenzene	760	4.4 J	1.4 U	1.6 U
MP-Xylene	1.4 J	1.8 U	2.7 U	N/A
Toluene	0.97	0.91 U	1.4 U	1.6 U
Total Xylenes	13.9 J	2.7 U	4.0 U	4.6 U

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected. The associate numerical value is the sample detection limit.
N/A - Analysis not available.
BGS - Below ground surface.
µg/kg - Micrograms per kilogram.

Table 5-7

SOIL GAS SAMPLE FIELD ANALYTICAL RESULTS
FORMER IDOT MAINTENANCE FACILITY
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	Sample Location	Depth (BGS)	1,1-DCE	trans-1,2-DCE	cis-1,2-DCE	TCE
94244851	AL01	6'	0.13[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244851	AL01	12'	0.07[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244852	AL02	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244853[b]	AL02	12'	0.7[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244854	AL03	6'	0.8[a] F*	0.01 UF*	0.01 UF*	0.0F UF*
94244855	AL03	12'	1.1[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244856	AL04	6'	0.2[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244857	AL04	12'	0.2[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244858	AL05	6'	0.6[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244859	AL05	12'	0.4[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244860	AL06	6'	0.4[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244861	AL06	12'	0.9[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244862	AL06	33'	1.6[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244863	AL07	6'	0.15[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244864	AL07	12'	0.06[a] F*	0.01 UF*	0.01 UF*	0.01 UF*

a - Probable interference with compound with overlapping retention time.
b - Confirmed at EPA Region 10 laboratory with sample number 94244341 (see Table 5-8).
F - The "F" qualifier indicates the associated numerical value is an estimate due to the use of less-rigorous FASP methods.
U - The analyte was not detected. The associate numerical value is the sample detection limit.
µg/L - Micrograms per liter of water
* **Note: Problems with procedures used to collect and analyze the soil gas samples during Phase I field activities have been identified. The problems include both field and confirmation soil gas samples collected by ESAT and analyzed at both the ESAT field laboratory (FASP) and EPA Region 10 laboratory during Phase I field activities. Based upon these problems, it has been determined that the Phase I soil gas analytical results are not valid. At the request of EPA, the Phase I FASP soil gas results are included in this report for informational purposes.**

Table 5-8

SOIL GAS CONFIRMATION SAMPLE ANALYTICAL RESULTS
FORMER IDOT MAINTENANCE FACILITY
EPA REGION 10 LABORATORY
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	94244341
Sample Location	AL02
Depth (BGS)	12'
Analyte	
1-Methylethylbenzene	0.0042 J*
1,2,3-Trichlorobenzene	0.028 J*
1,2-Dimethylbenzene	0.019 J*
Ethylbenzene	0.012 J*
Propylbenzene	0.0081 J*
Butylbenzene	0.0068 J*
Carbon Tetrachloride	0.0098 J*
1,1,1-Trichloroethane	0.10*
1,2,4-Trichlorobenzene	0.024 J*
1,2,4-Trimethylbenzene	0.016 J*
1,3,5-Trimethylbenzene	0.0091 J*
Dichlorodifluoromethane	0.62 J*
MP-Xylene	0.044 J*
Toluene	0.075*
Total Xylenes	0.063 J*
Trichlorofluoromethane	1.5*
Hexachlorobutadiene	0.021 J*
Naphthalene	0.032 J*
Tetrachloroethene	0.013 J*

J - The analyte was positively identified. The associated numerical result is an estimate.
µg/L - Micrograms per liter of water.
BGS - Below ground surface.
* Note: Problems with procedures used to collect and analyze the soil gas samples during Phase I field activities have been identified. The problems include both field and confirmation soil gas samples collected by ESAT and analyzed at both the ESAT field laboratory (FASP) and EPA Region 10 laboratory during Phase I field activities. Based upon these problems, it has been determined that the Phase I soil gas analytical results are not valid. At the request of EPA, the Phase I FASP soil gas results are included in this report for informational purposes.

Table 5-9

SOIL GAS SAMPLE FIELD ANALYTICAL RESULTS
IDOT MAINTENANCE FACILITY ON RAMSEY ROAD
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	Sample Location	Depth (BGS)	1,1-DCE	trans-1,2-DCE	cis-1,2-DCE	TCE
94234730[a]	RA01	12'	Large peaks over target compounds. Detector saturated.			
94234731	RA01	34'	0.1[b] F*	0.01 UF*	0.01 UF*	0.01 UF*
94234732	RA02	40'	0.06[b] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244867	DT01	45'	0.7[b] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244868	DT02	6'	0.09[b] F*	0.01 UF*	0.01 UF*	0.01 UF*
94244869	DT02	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244870	DT03	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244871	DT03	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244872	DT04	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244873	DT04	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244874	DT05	6'	1.1[b] UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244875[c]	DT05	12'	0.01 UF*	0.2[b] UF*	0.01 UF*	0.01 UF*
94244876	DT06	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244877	DT06	12'	0.2[b] F*	0.01 UF*	0.01 UF*	0.01 UF*

a - Confirmed at EPA Region 10 laboratory with sample number 94244344 (see Table 5-10).
b - Probable interference with compound with overlapping retention time.
c - Confirmed at EPA Region 10 laboratory with sample number 94244346 (see Table 5-10).
F - The "F" qualifier indicates the associated numerical value is an estimate due to the use of less-rigorous FASP methods.
U - The analyte was not detected. The associate numerical value is the sample detection limit.
µg/L - Micrograms per liter of water.
BGS - Below ground surface.
* Note: Problems with procedures used to collect and analyze the soil gas samples during Phase I field activities have been identified. The problems include both field and confirmation soil gas samples collected by ESAT and analyzed at both the ESAT field laboratory (FASP) and EPA Region 10 laboratory during Phase I field activities. Based upon these problems, it has been determined that the Phase I soil gas analytical results are not valid. At the request of EPA, the Phase I FASP soil gas results are included in this report for informational purposes.

Table 5-10

SOIL GAS CONFIRMATION SAMPLE ANALYTICAL RESULTS
IDOT MAINTENANCE FACILITY ON RAMSEY ROAD
EPA REGION 10 LABORATORY
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	94244344	94244346
Sample Location	RA01	DT05
Depth (BGS)	12'	12'
Analyte		
1,2-Dimethylbenzene	0.010 J*	0.0036 J*
Ethylbenzene	0.0079 J*	0.0034 J*
Propylbenzene	0.0030 J *	0.033 U*
1,1,1-Trichloroethane	0.037 U*	0.011 J*
1,4-Dichlorobenzene	0.0072 J*	0.033 U*
1,2,4-Trimethylbenzene	0.026 J*	0.0053 J*
1,3,5-Trimethylbenzene	0.0091 J*	0.033 U*
Dichlorodifluoromethane	0.65 J*	0.66 J*
MP-Xylene	0.032 J*	0.014 J*
Toluene	0.055*	0.028 J*
Total Xylenes	0.043 J*	0.017 J*
Trichlorofluoromethane	0.026 J*	0.10*
Styrene	0.0020 J*	0.033 U*
Tetrachloroethene	0.0034 J*	0.0078 J*
Trichloroethene	0.037 U*	0.017 J*

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected. The associate numerical value is the sample detection limit.
µg/L - Micrograms per liter of water.
BGS - Below ground surface.
* **Note: Problems with procedures used to collect and analyze the soil gas samples during Phase I field activities have been identified. The problems include both field and confirmation soil gas samples collected by ESAT and analyzed at both the ESAT field laboratory (FASP) and EPA Region 10 laboratory during Phase I field activities. Based upon these problems, it has been determined that the Phase I soil gas analytical results are not valid. At the request of EPA, the Phase I FASP soil gas results are included in this report for informational purposes.**

Table 5-11

SOIL GAS AND GROUNDWATER SAMPLE FIELD ANALYTICAL RESULTS
KOOTENAI COUNTY LANDFILL-RAMSEY ROAD
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	Sample Location	Depth (BGS)	1,1-DCE	trans-1,2-DCE	cis-1,2-DCE	TCE
98434725	WL68	17?'	1 UF	1 UF	1 UF	1 UF
94244892	LF01	65'	0.3[a] F*	0.02 UF*	0.02 UF*	0.02 UF*
94244893	LF01	98'	0.3[a] F*	0.02 UF*	0.02 UF*	0.02 UF*
94244894	LF01	15'	0.3[a] F*	0.6[a] F*	0.02 UF*	0.02 UF*
94244895	LF02	39'	0.2[a] F*	0.02 UF*	0.02 UF*	0.02 UF*
94244896	LF02	20'	0.4[a] F*	0.02 UF*	0.02 UF*	0.02 UF*
94244897	LF03	25'	1.4[a] F*	0.8[a] F*	0.02 UF*	0.02 UF*
94244898	LF03	48'	0.02 UF*	0.02 UF*	0.02 UF*	0.02 UF*
94244899	LF04	~ 20'	0.03[a] F*	0.02 UF*	0.02 UF*	0.02 UF*
94244900	LF04	~ 40'	0.02 UF*	0.02 UF*	0.02 UF*	0.02 UF*
94244901	LF05	~ 20'	0.02 UF*	0.02 UF*	0.02 UF*	0.02 UF*
94244902	LF05	~ 40'	0.02 UF*	0.02 UF*	0.02 UF*	0.02 UF*
94234733	RA03	12'	0.1[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94234734	RA04	12'	Large peaks over target compounds. Detector saturated.			
94234735	RA04	30'	0.05[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94234736	RA05	12'	0.05[a] F*	0.01 UF*	0.01 UF*	0.01 UF*
94234737	RA05	30'	0.2[a] F*	0.01 UF*	0.01 UF*	0.01 UF*

F - The "F" qualifier indicates the associated numerical value is an estimate due to the use of less-rigorous FASP methods.
U - The analyte was not detected. The associate numerical value is the sample detection limit.
µg/L - Micrograms per liter of water.
BGS - Below ground surface.

* Note: Problems with procedures used to collect and analyze the soil gas samples during Phase I field activities have been identified. The problems include both field and confirmation soil gas samples collected by ESAT and analyzed at both the ESAT field laboratory (FASP) and EPA Region 10 laboratory during Phase I field activities. Based upon these problems, it has been determined that the Phase I soil gas analytical results are not valid. At the request of EPA, the Phase I FASP soil gas results are included in this report for informational purposes.

Table 5-12

**SOIL GAS CONFIRMATION SAMPLE ANALTYICAL RESULTS - KOOTENAI COUNTY LANDFILL
EPA REGION 10 LABORATORY
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)**

Sample Number	94244332
Sample Location	LF02
Depth (BGS)	58'
Analyte	
1,1,1-Trichloroethane	0.0030 J*
2-Butanone	0.036 J*
Carbon disulfide	0.013 J*
Chloroform	0.0025 J*
Dichlorodifluoromethane	0.55 J*
Trichlorofluoromethane	0.0092 J*
Tetrachloroethene	0.025 J*
Trichloroethene	0.040 J*

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected. The associate numerical value is the sample detection limit.
µg/L - Micrograms per liter of water.
BGS - Below ground surface.
* **Note: Problems with procedures used to collect and analyze the soil gas samples during Phase I field activities have been identified. The problems include both field and confirmation soil gas samples collected by ESAT and analyzed at both the ESAT field laboratory (FASP) and EPA Region 10 laboratory during Phase I field activities. Based upon these problems, it has been determined that the Phase I soil gas analytical results are not valid. At the request of EPA, the Phase I FASP soil gas results are included in this report for informational purposes.**

Table 5-13

SOIL GAS SAMPLE FIELD ANALYTICAL RESULTS - INTERSTATE CONCRETE
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	Sample Location	Depth (BGS)	1,1-DCE	trans-1,2-DCE	cis-1,2-DCE	TCE
94244882	IC01	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244883	IC01	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244884	IC01	18'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244885	IC02	60'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244890	IC03	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244891	IC03	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*

F - The "F" qualifier indicates the associated numerical value is an estimate due to the use of less-rigorous FASP methods.
U - The analyte was not detected. The associate numerical value is the sample detection limit.
µg/L - Micrograms per liter of water
BGS - Below ground surface.

* Note: Problems with procedures used to collect and analyze the soil gas samples during Phase I field activities have been identified. The problems include both field and confirmation soil gas samples collected by ESAT and analyzed at both the ESAT field laboratory (FASP) and EPA Region 10 laboratory during Phase I field activities. Based upon these problems, it has been determined that the Phase I soil gas analytical results are not valid. At the request of EPA, the Phase I FASP soil gas results are included in this report for informational purposes.

Table 5-14

SOIL GAS SAMPLE FIELD ANALYTICAL RESULTS - PARK/DALTON AVENUE AREA
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	Sample Location	Depth (BGS)	1,1-DCE	trans-1,2-DCE	cis-1,2-DCE	TCE
94234796	PA01	24'	Trap was bent and could not be analyzed.			
94234797	PA02	29'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234798	DA01	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94234798	DA01	27'	Large peaks over target compounds. Detector saturated.			
94244865	SP01	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244866	SP01	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244878	FA01	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244879	FA01	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244880	FA02	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244881	FA02	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244886	PC01	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244887	PC01	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244888	PC02	6'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*
94244889	PC02	12'	0.01 UF*	0.01 UF*	0.01 UF*	0.01 UF*

F - The "F" qualifier indicates the associated numerical value is an estimate due to the use of less-rigorous FASP methods.
U - The analyte was not detected. The associate numerical value is the sample detection limit.
µg/L - Micrograms per liter of water.
BGS - Below ground surface.

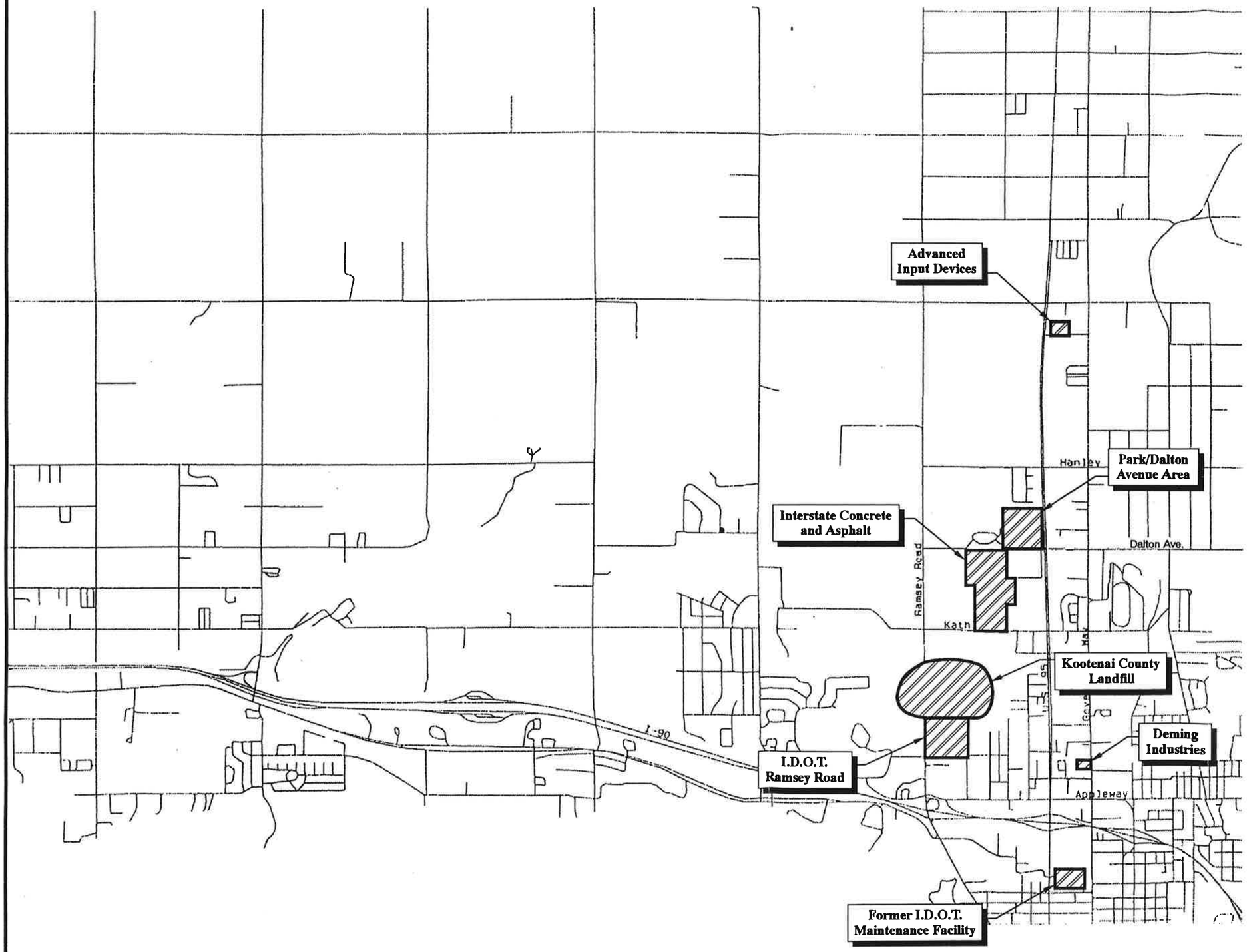
* Note: Problems with procedures used to collect and analyze the soil gas samples during Phase I field activities have been identified. The problems include both field and confirmation soil gas samples collected by ESAT and analyzed at both the ESAT field laboratory (FASP) and EPA Region 10 laboratory during Phase I field activities. Based upon these problems, it has been determined that the Phase I soil gas analytical results are not valid. At the request of EPA, the Phase I FASP soil gas results are included in this report for informational purposes.

Table 5-15

SOIL GAS CONFIRMATION SAMPLE ANALYTICAL RESULTS
PARK/DALTON AVENUE AREA
EPA REGION 10 LABORATORY
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	94244338
Sample Location	DA01
Depth (BGS)	27'
Analyte	
1,2-Dimethylbenzene	0.0084 J*
Ethylbenzene	0.0089 J*
Propylbenzene	0.0017 J*
Benzene	0.0087 J*
1,2,4-Trimethylbenzene	0.011 J*
Dichlorodifluoromethane	0.015 J*
MP-Xylene	0.026 J*
Toluene	0.063*
Total Xylenes	0.035 J*
Trichlorofluoromethane	0.049*
Naphthalene	0.0040 J*
Styrene	0.0025 J*
Tetrachloroethene	0.013 J*

J - The analyte was positively identified. The associated numerical result is an estimate.
µg/L - Micrograms per liter of water.
BGS - Below ground surface.
* Note: Problems with procedures used to collect and analyze the soil gas samples during Phase I field activities have been identified. The problems include both field and confirmation soil gas samples collected by ESAT and analyzed at both the ESAT field laboratory (FASP) and EPA Region 10 laboratory during Phase I field activities. Based upon these problems, it has been determined that the Phase I soil gas analytical results are not valid. At the request of EPA, the Phase I FASP soil gas results are included in this report for informational purposes.



LEGEND

Potential Source Areas Investigated During Phase I Fieldwork

N

0 1000 2000 3000 4000

Approximate Scale in Feet

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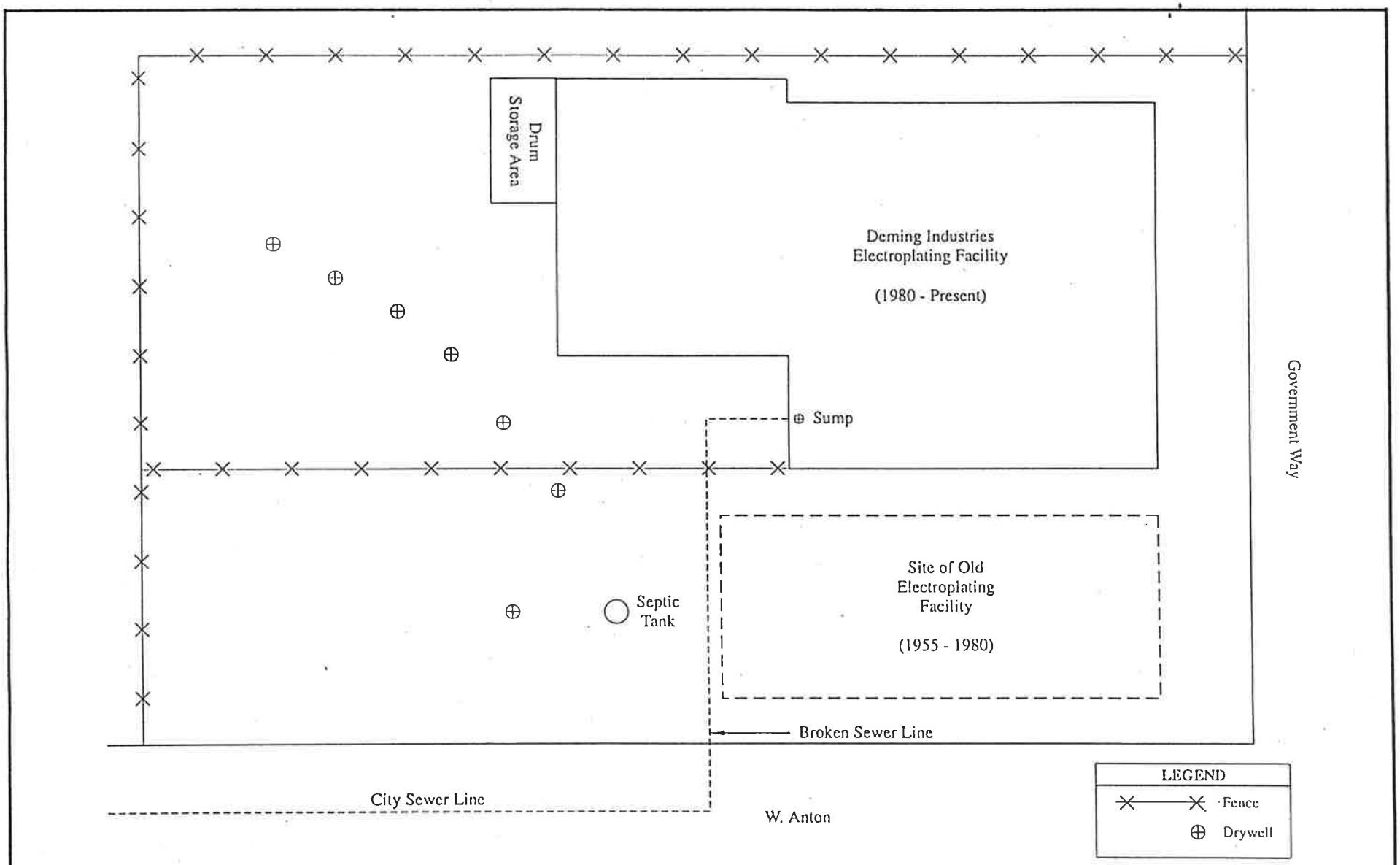
Figure 5-1
SITE LOCATION MAP

COEUR D'ALENE GROUNDWATER CONTAMINATION SITE
Coeur d'Alene, Idaho

DRAWN BY:	DATE:	JOB NO:	DWG NO:
GIS	7-12-95	ZO3055	2129FG.CDR



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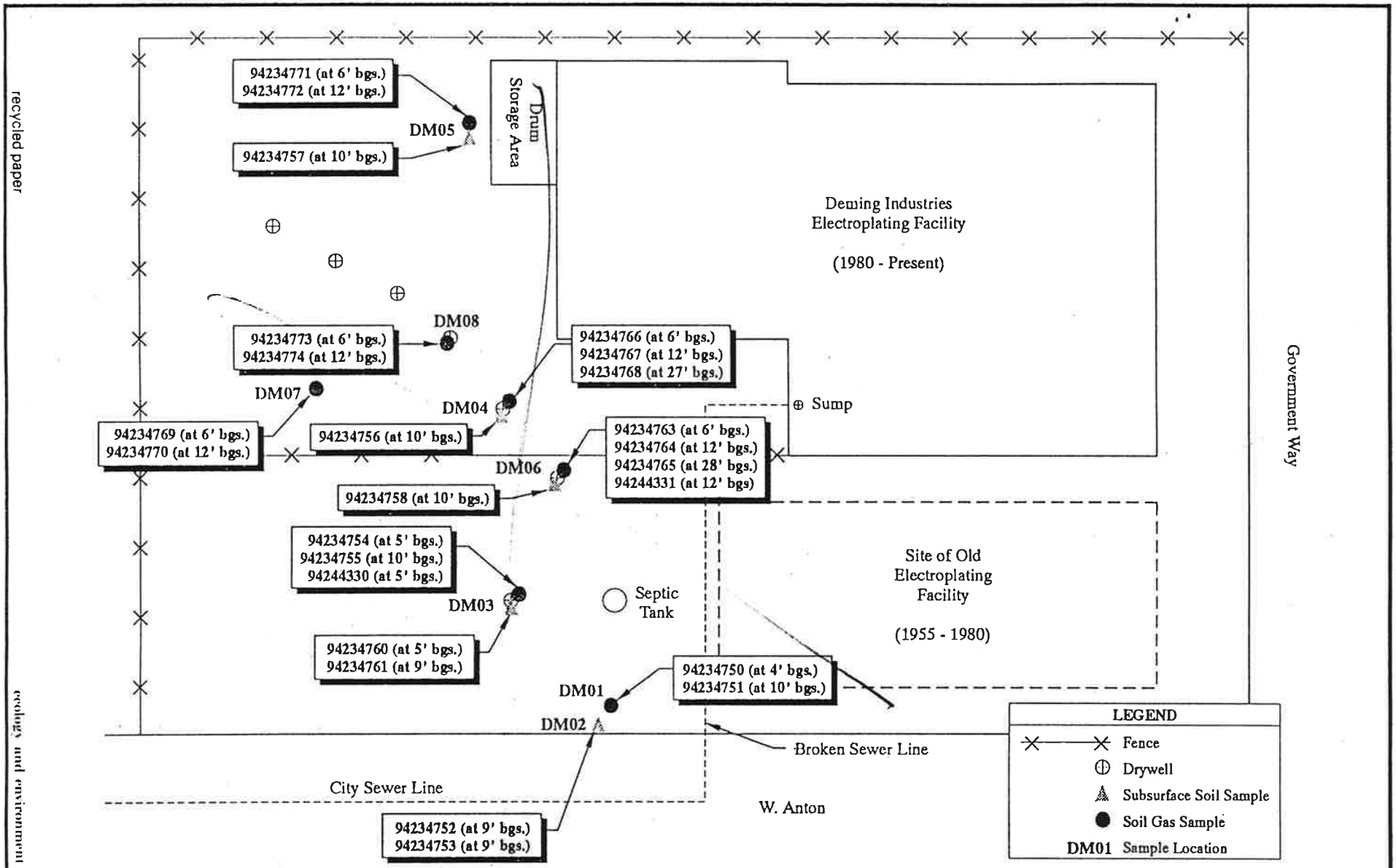
COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

0 15' 30'
Approximate Scale In Feet

Figure 5-2
SITE MAP
DEMING INDUSTRIES

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	11-14-94	ZO3901	1941SM



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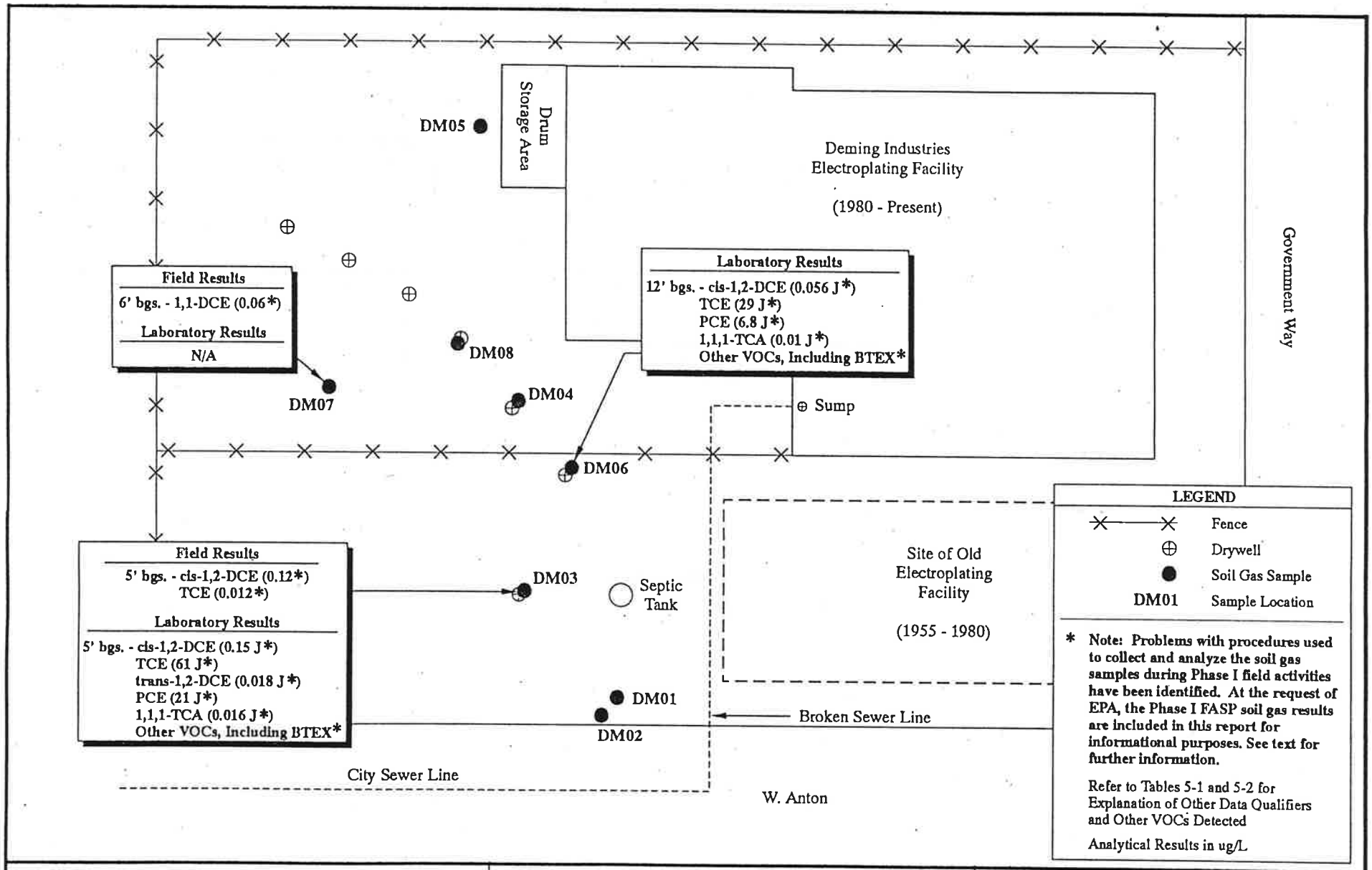
COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

0 15' 30'
Approximate Scale In Feet

Figure 5-3
SAMPLE LOCATION MAP
DEMING INDUSTRIES

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	7-10-95	ZO3901	1BSM



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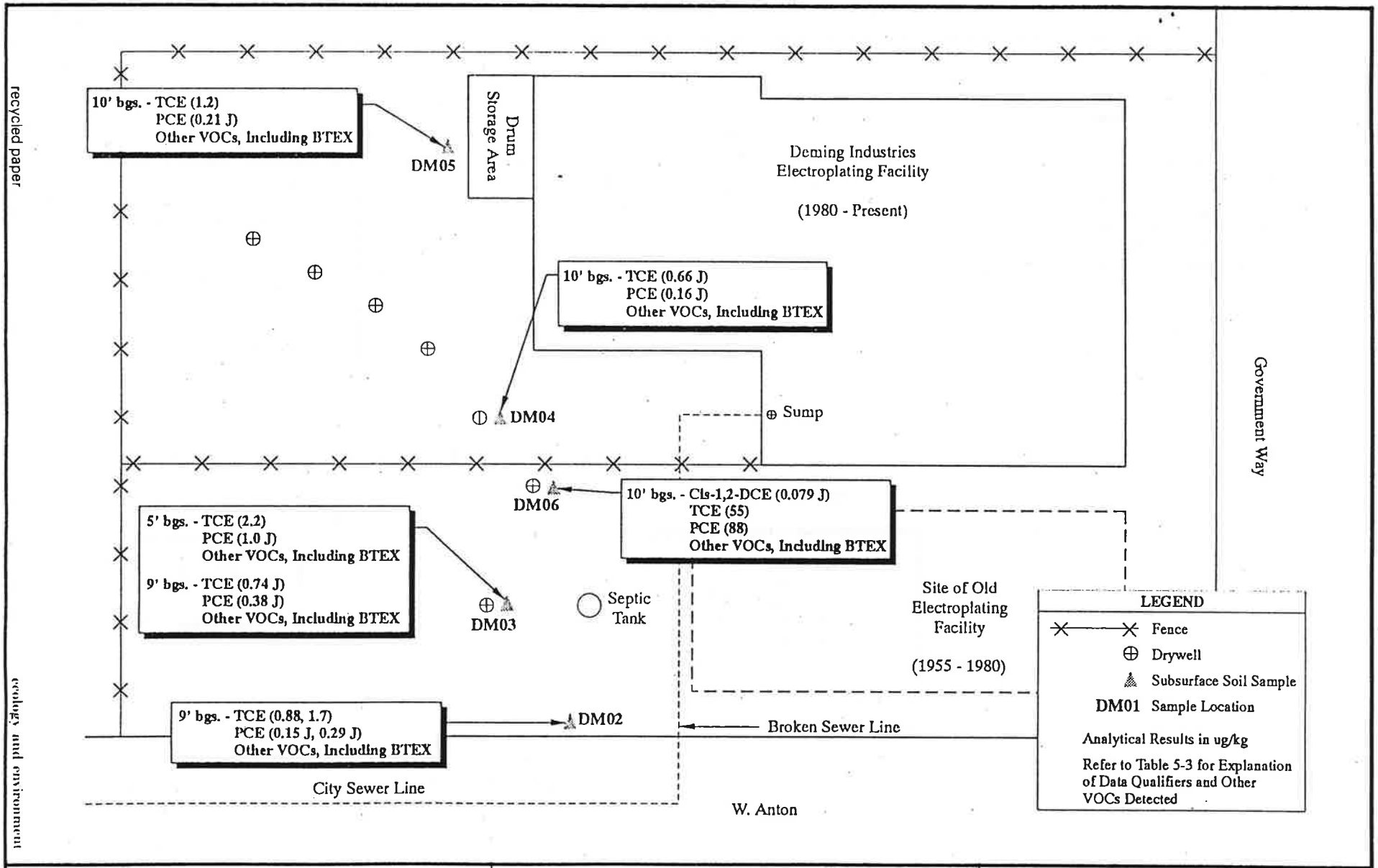
COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

0 15' 30'
Approximate Scale in Feet

Figure 5-4
SOIL GAS SAMPLE RESULTS
DEMING INDUSTRIES

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	7-10-95	ZO3901	1941ASM



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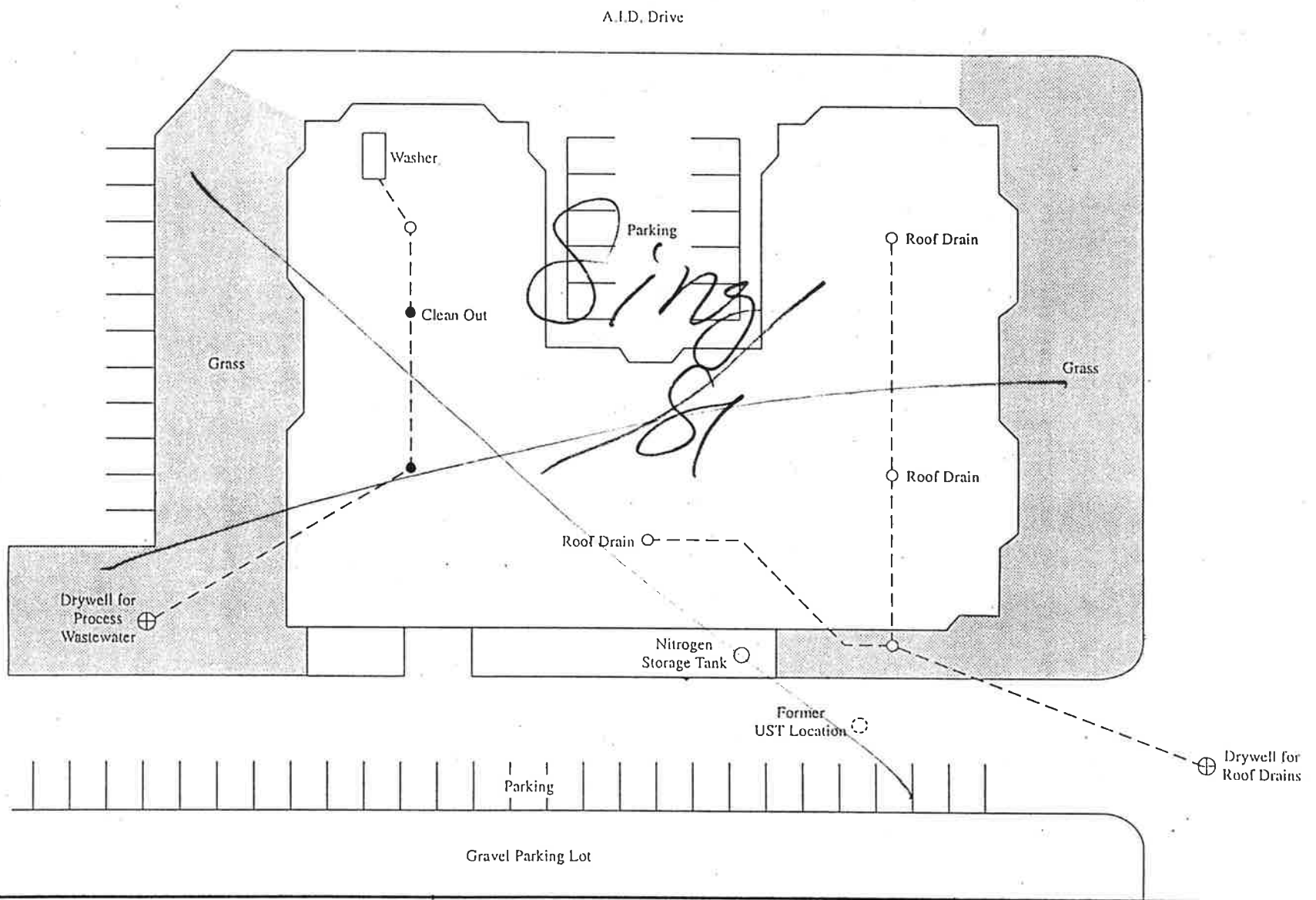
Seattle, Washington

COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

0 15' 30'
Approximate Scale in Feet

Figure 5-5
SOIL SAMPLE RESULTS
DEMING INDUSTRIES

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	7-10-95	ZO3901	1CSM



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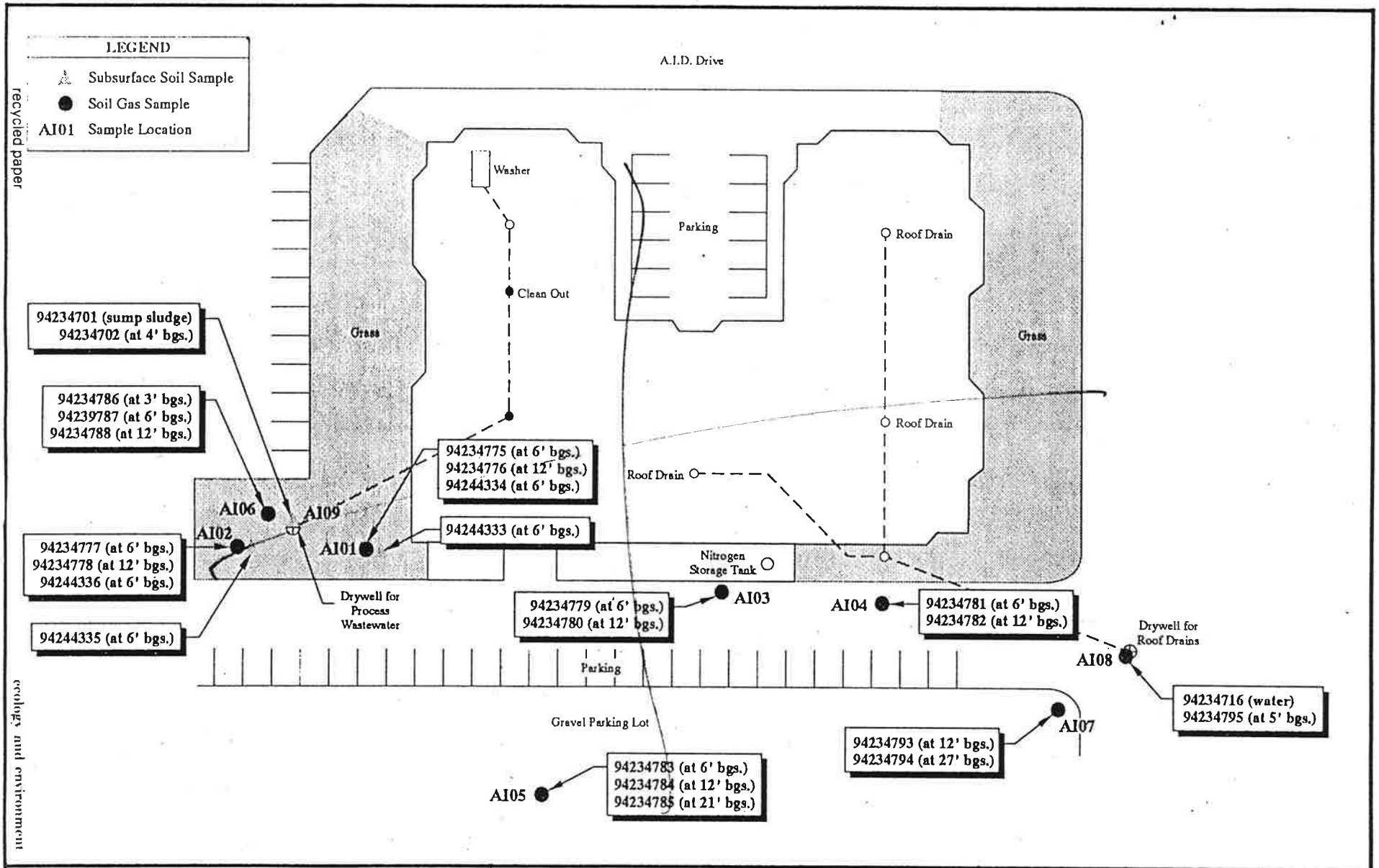
COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

Not to Scale

Figure 5-6
SITE MAP
ADVANCED INPUT DEVICES (A.I.D.)

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	11-14-94	ZO3901	1942SM



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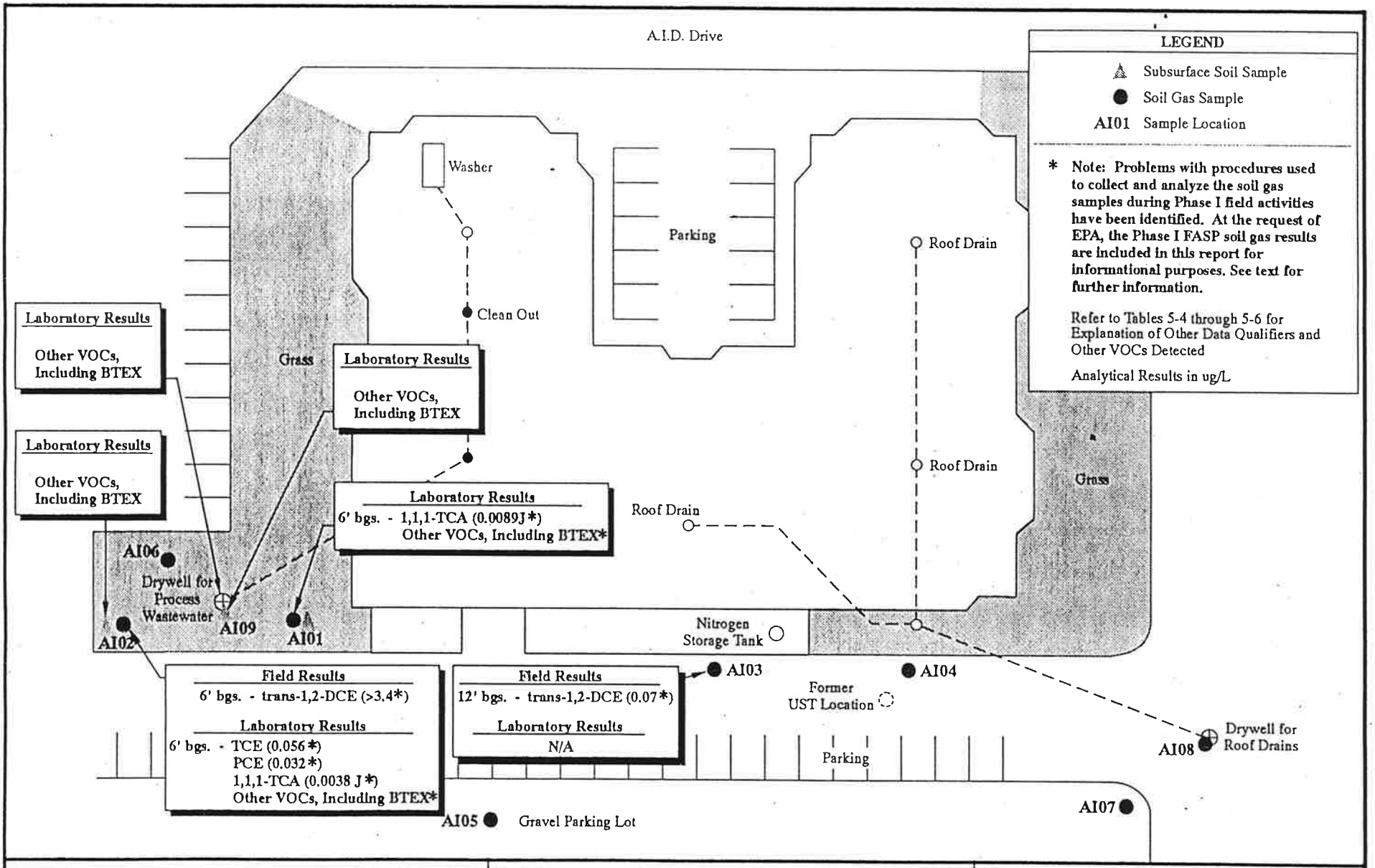
S[illegible] Washington

COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

Not to Scale

Figure 5-7
SAMPLE LOCATION MAP
ADVANCED INPUT DEVICES (A.I.D.)

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	7-10-95	ZO3901	2ASM



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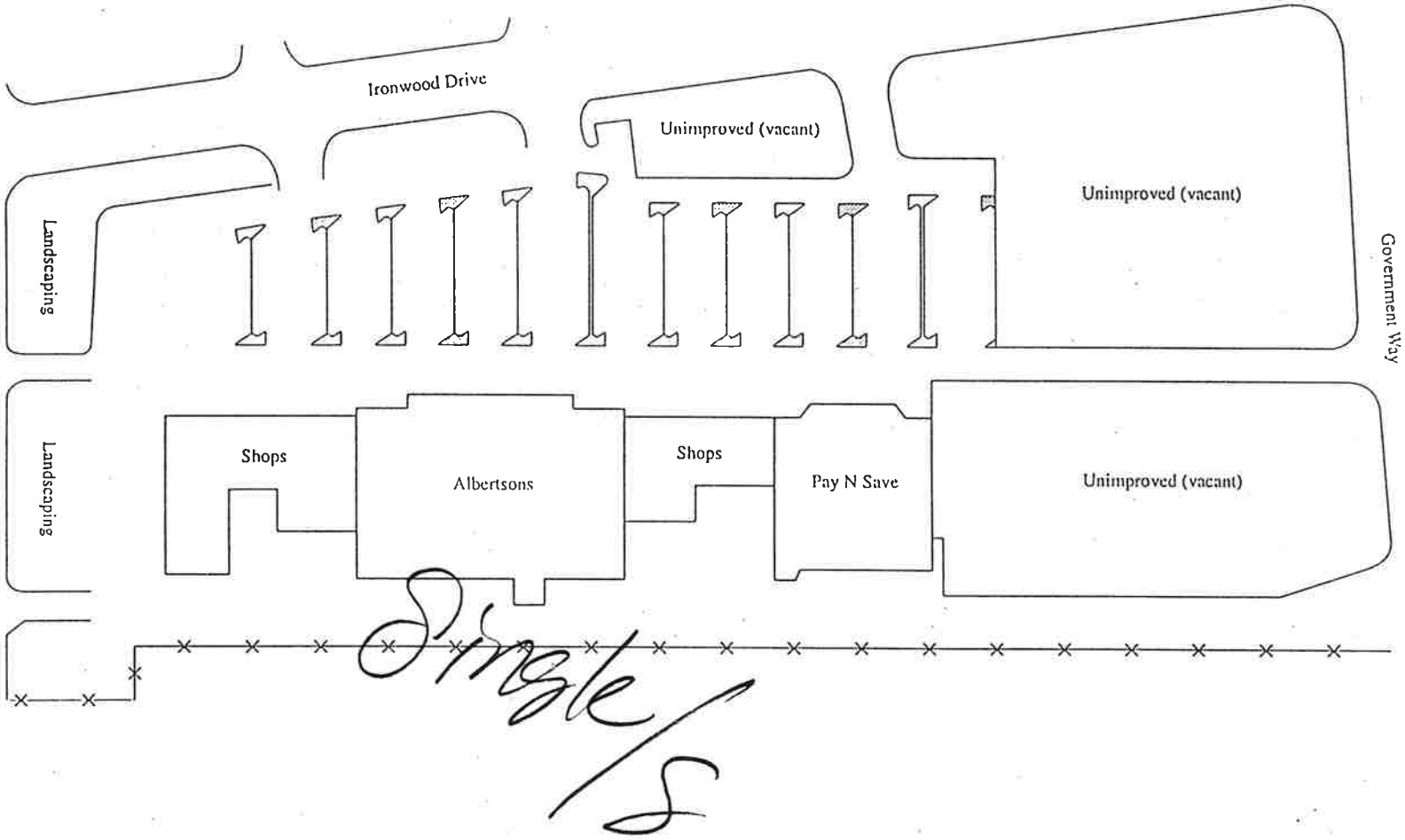
COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

Not to Scale

Figure 5-8
SAMPLE RESULTS
ADVANCED INPUT DEVICES (A.I.D.)

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	7-10-95	ZO3901	1942BSM



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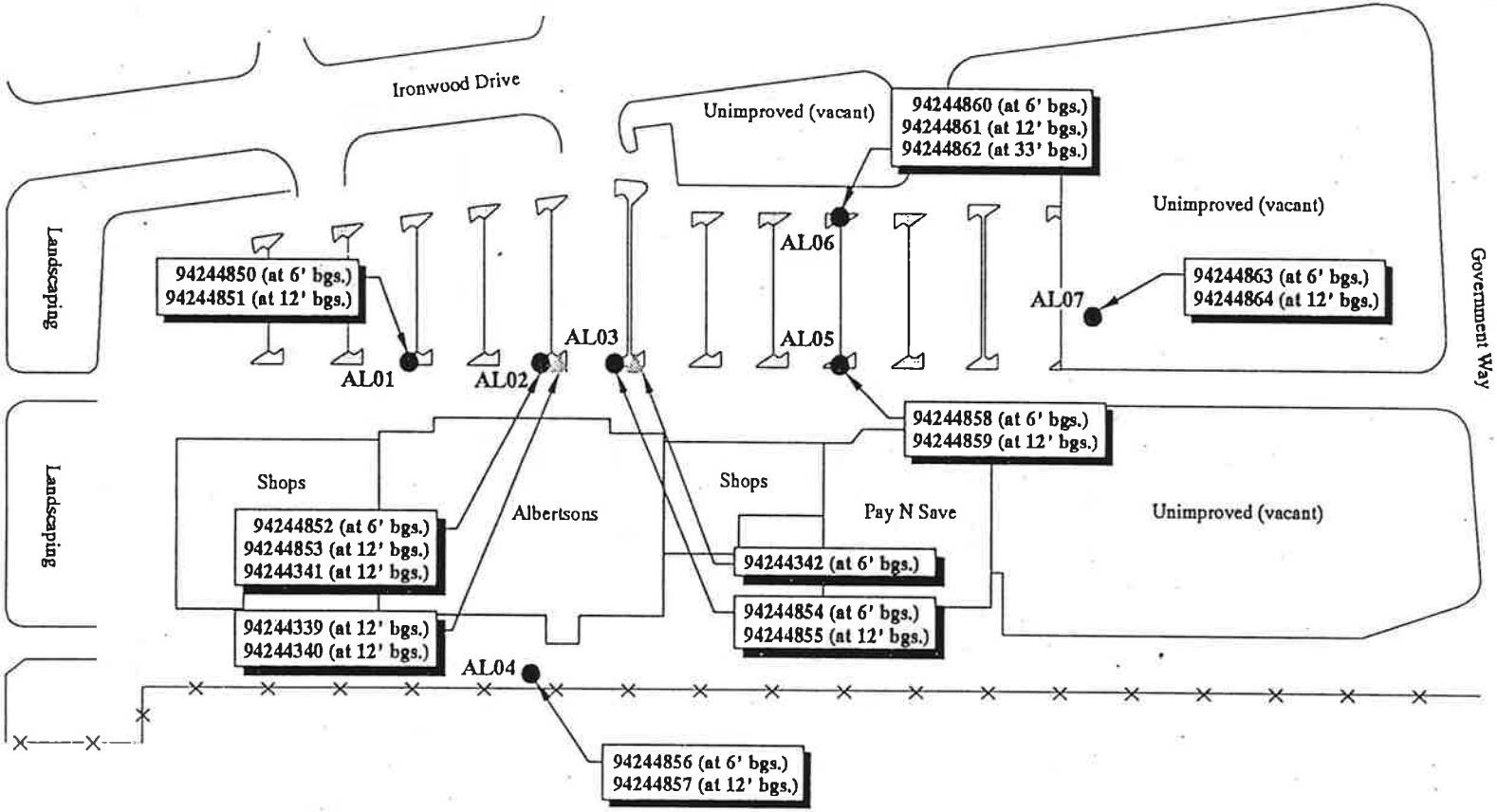
COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

0 80' 160'
Approximate Scale in Feet

Figure 5-9
SITE MAP
ALBERTSON'S
(FORMER IDOT MAINTENANCE FACILITY)

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	11-14-94	ZO3901	J46SM



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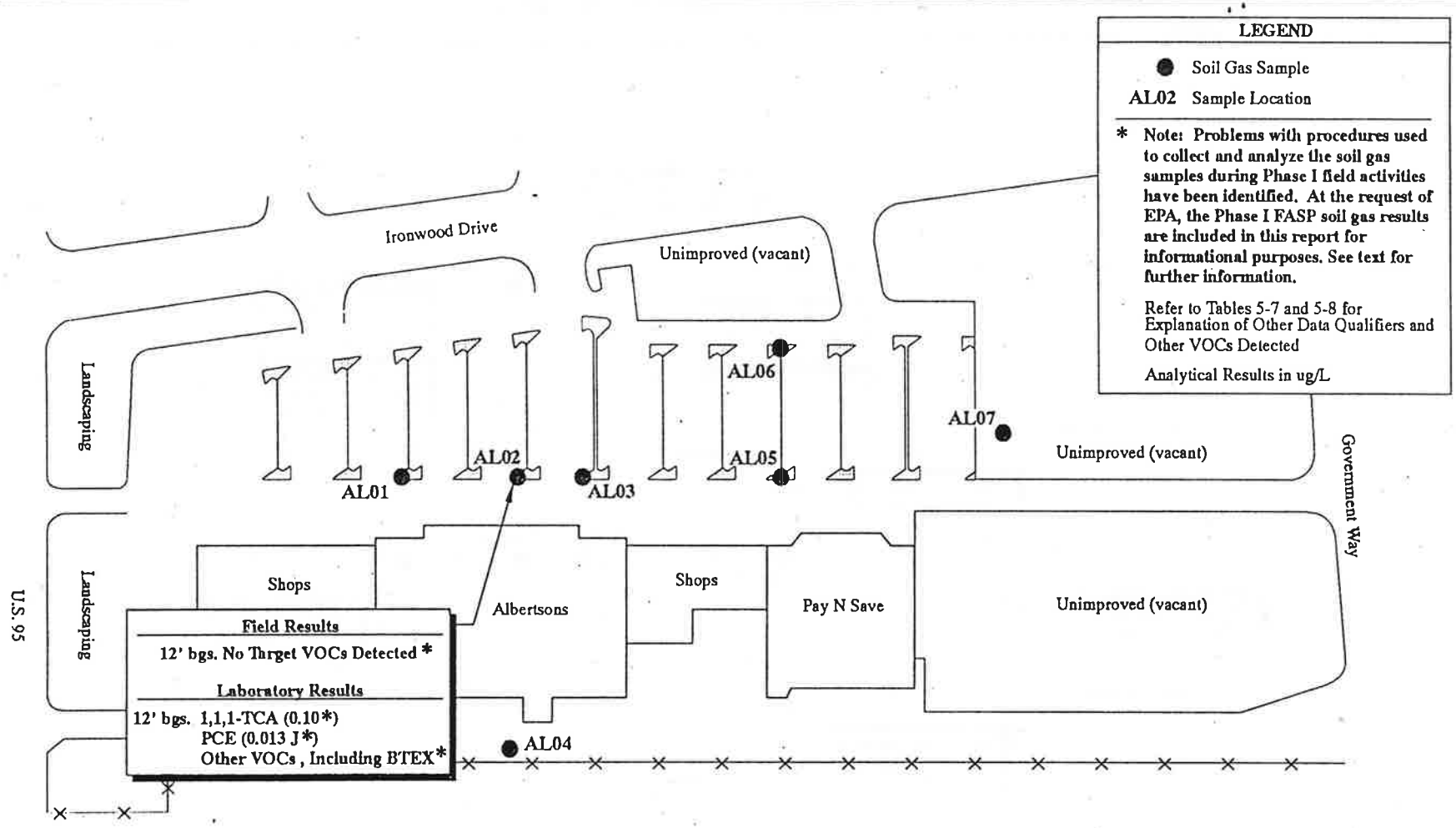
COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

0 80' 160'
Approximate Scale in Feet

Figure 5-10
SAMPLE LOCATION MAP
ALBERTSON'S
(FORMER IDOT MAINTENANCE FACILITY)

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	7-10-95	ZO3901	1946ASM



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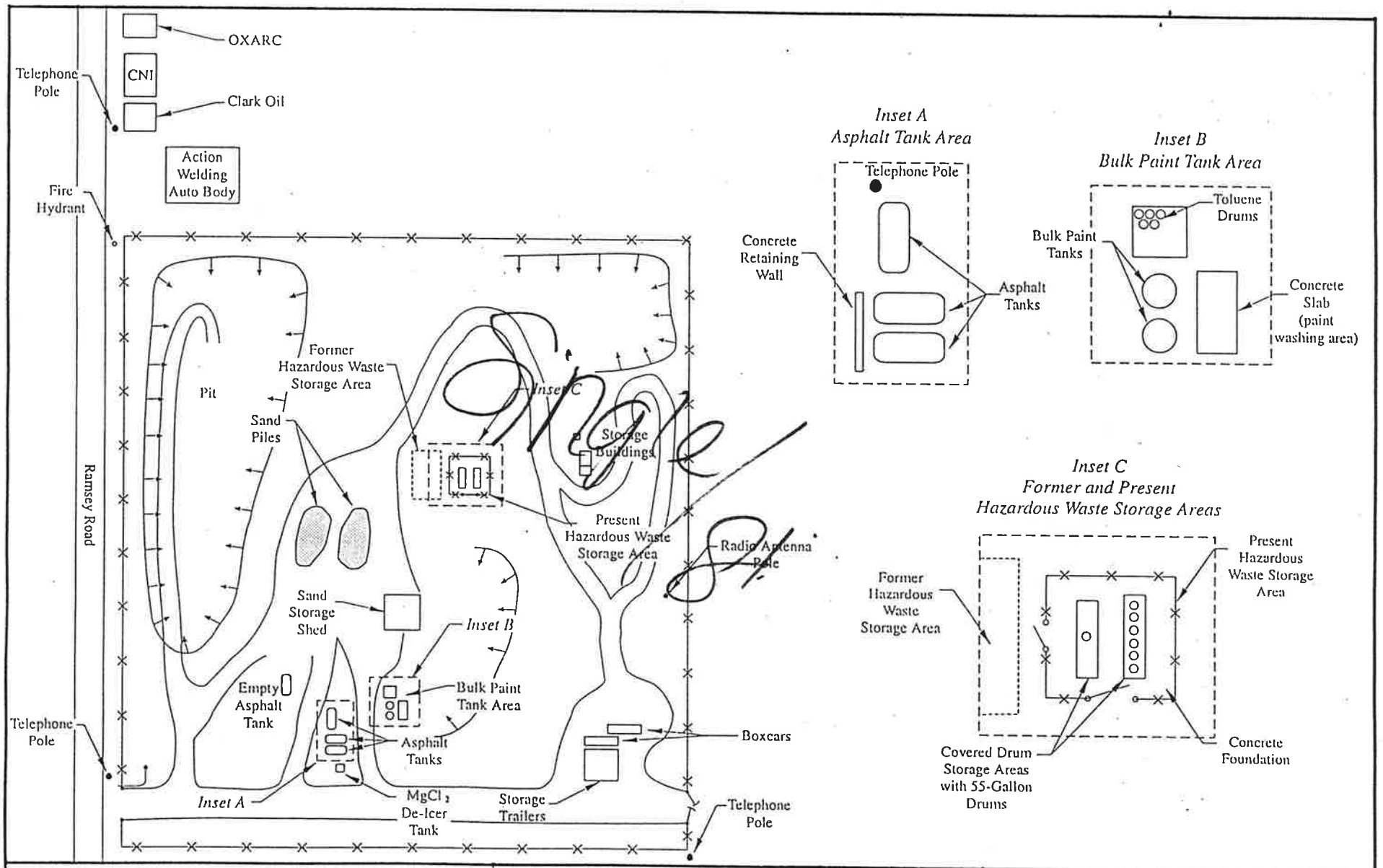
COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

0 80' 160'
Approximate Scale In Feet

Figure 5-11
SAMPLE RESULTS
ALBERTSON'S
(FORMER IDOT MAINTENANCE FACILITY)

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	7-10-95	ZO3901	SM



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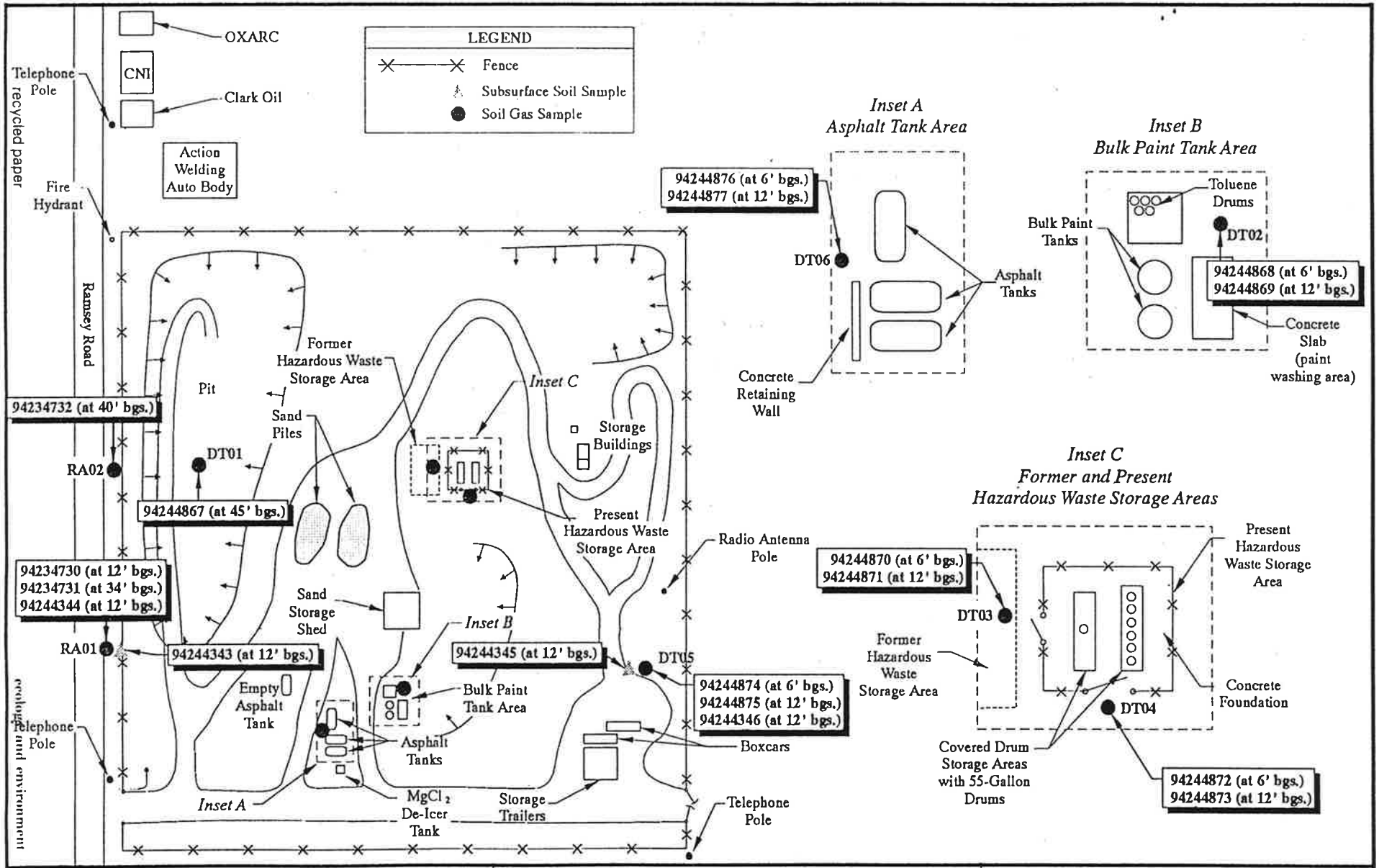
COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

Not to Scale

Figure 5-12
SITE MAP
IDOT - RAMSEY ROAD

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	6-27-94	ZO3901	1945SM



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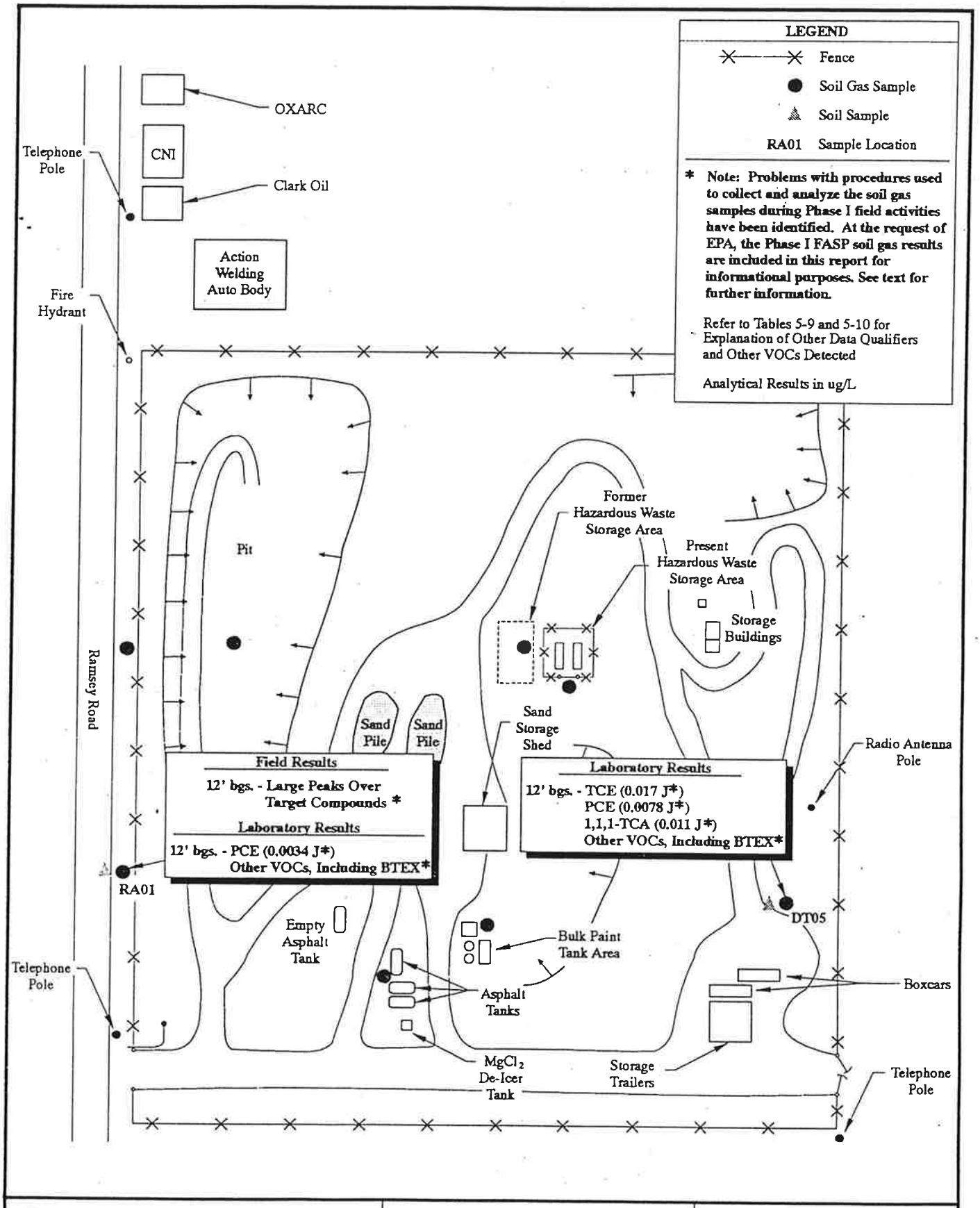
COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

Not to Scale

Figure 5-13
SAMPLE LOCATION MAP
IDOT - RAMSEY ROAD

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	7-10-95	ZO3901	SASM



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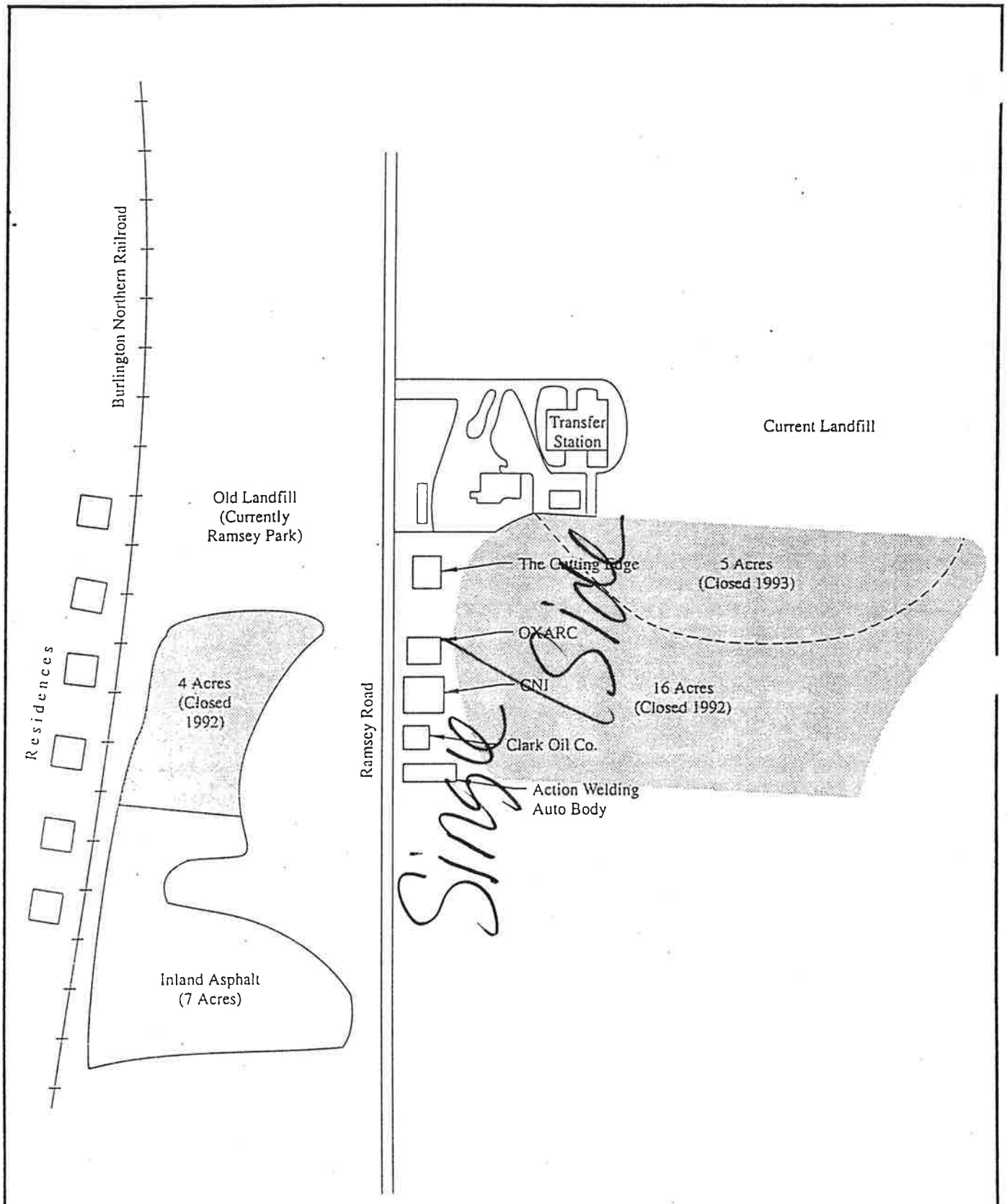
COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

Figure 5-14
SAMPLE RESULTS MAP
IDOT - RAMSEY ROAD

Not to Scale

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	7-10-95	ZO3901	1945BSM



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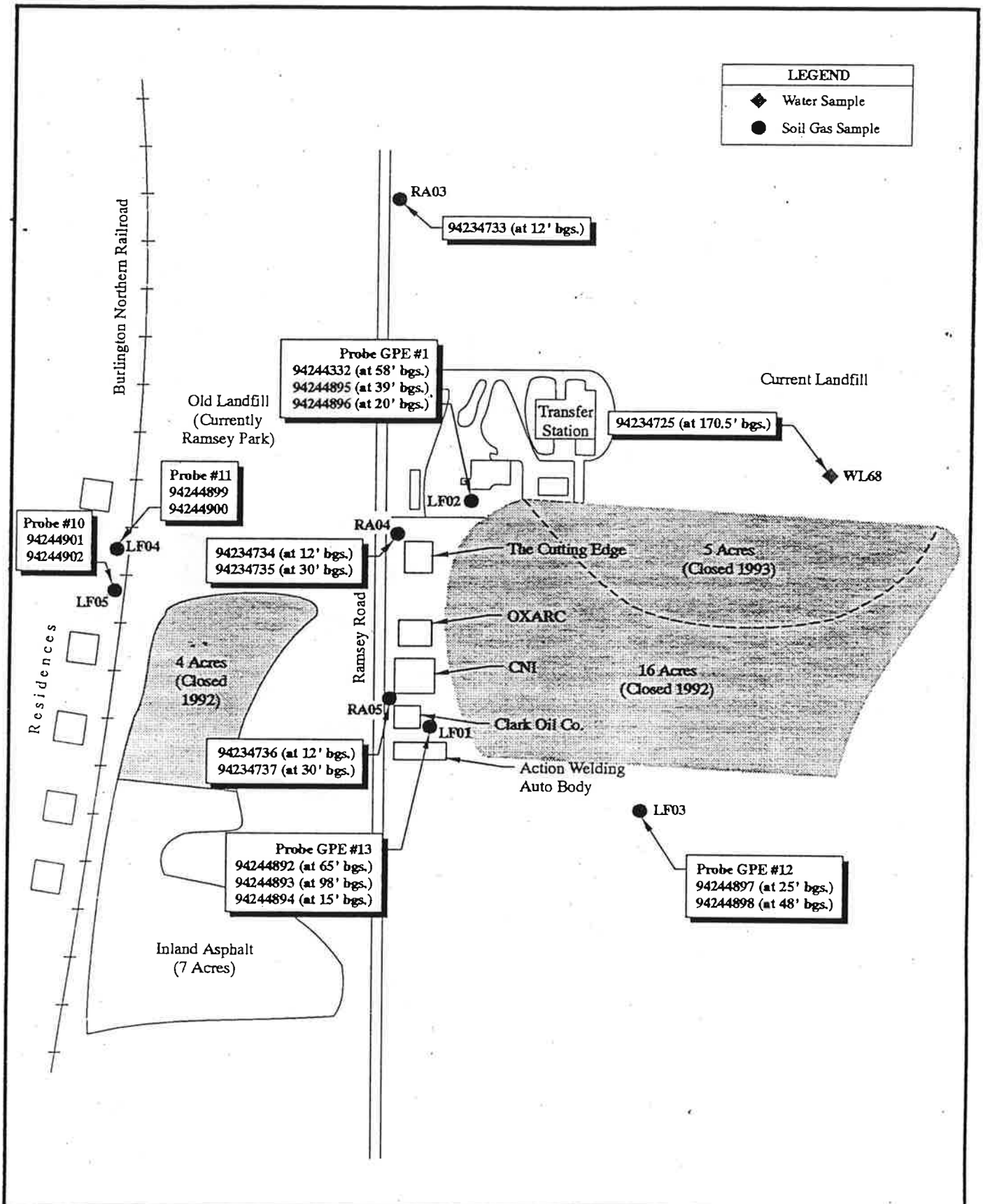
COEUR D'ALENE
GROUNDWATER ESI
Coeur d'Alene, Idaho

Figure 5-15
SITE MAP
KOOTENAI COUNTY LANDFILL

0 150' 300'
Approximate Scale in Feet

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	7-13-94	ZO3901	1953SM

ecology and environment



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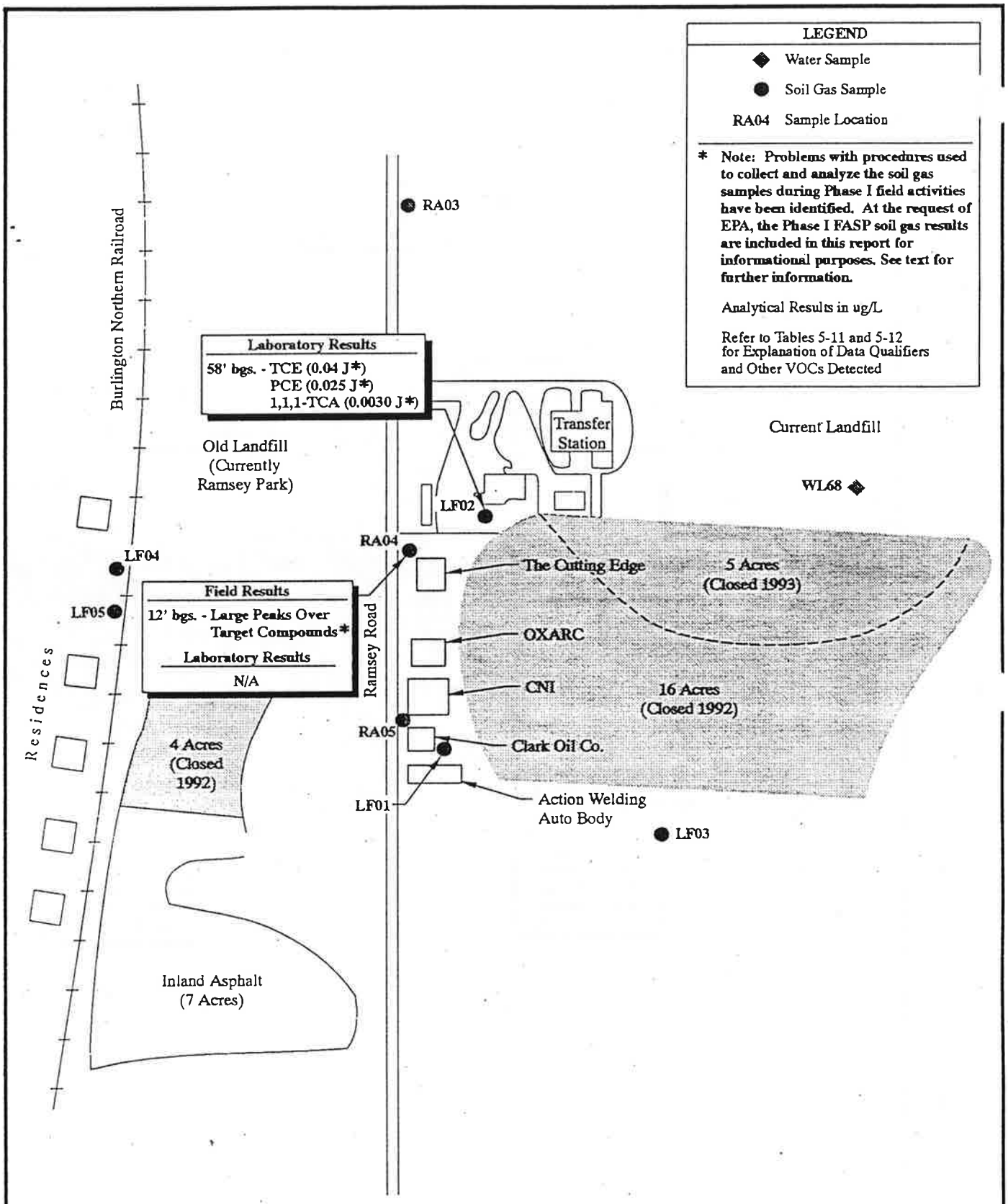
COEUR D'ALENE
GROUNDWATER ESI
Coeur d'Alene, Idaho

Figure 5-16
SAMPLE LOCATION MAP
KOOTENAI COUNTY LANDFILL

0 150' 300'
Approximate Scale in Feet

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	7-10-95	ZO3901	1953ASM



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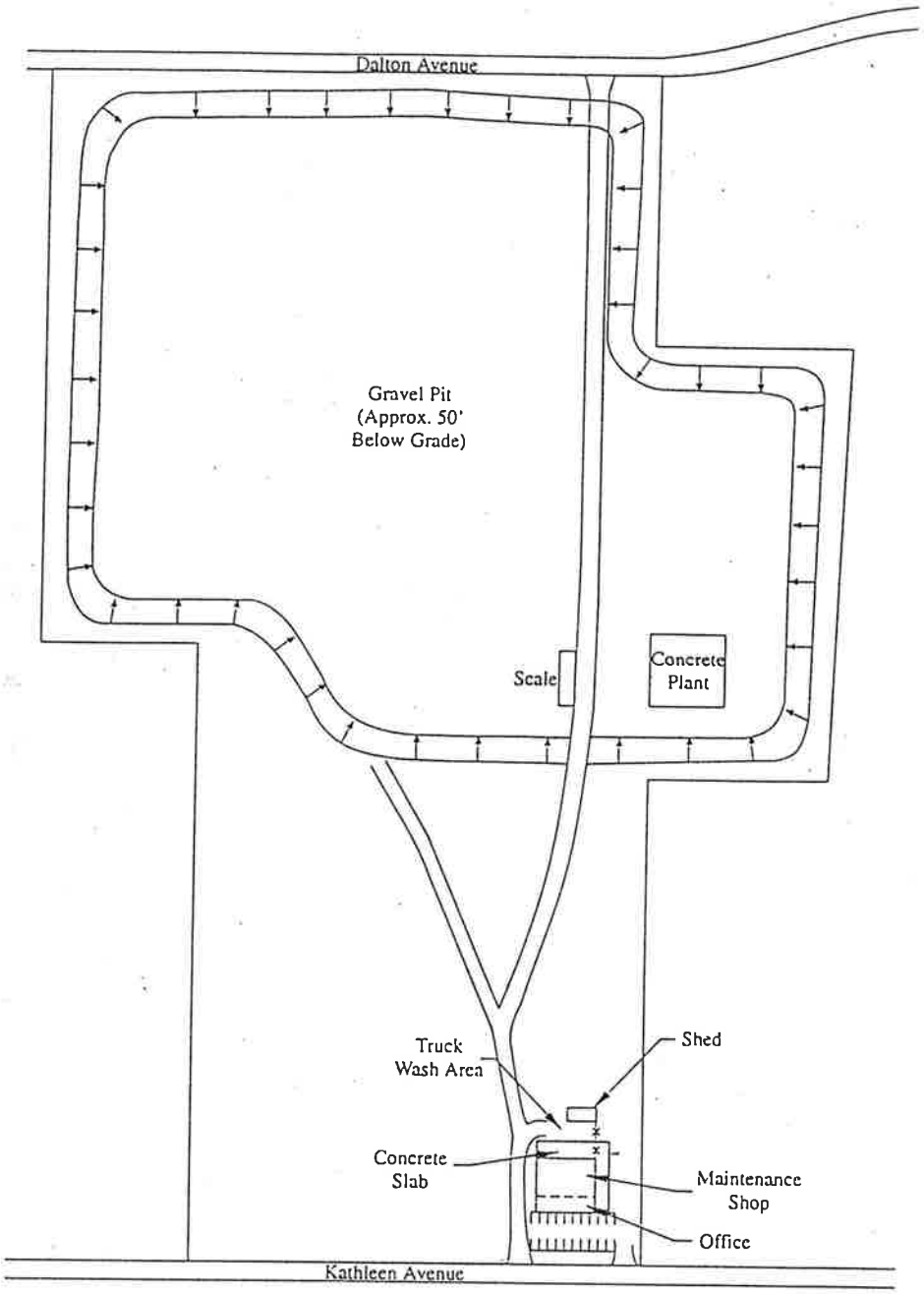
Seattle, Washington

COEUR D'ALENE
GROUNDWATER ESI
Coeur d'Alene, Idaho

0 150' 300'
Approximate Scale in Feet

Figure 5-17
SAMPLE RESULTS
KOOTENAI COUNTY LANDFILL

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	7-10-95	ZO3901	1953ASM



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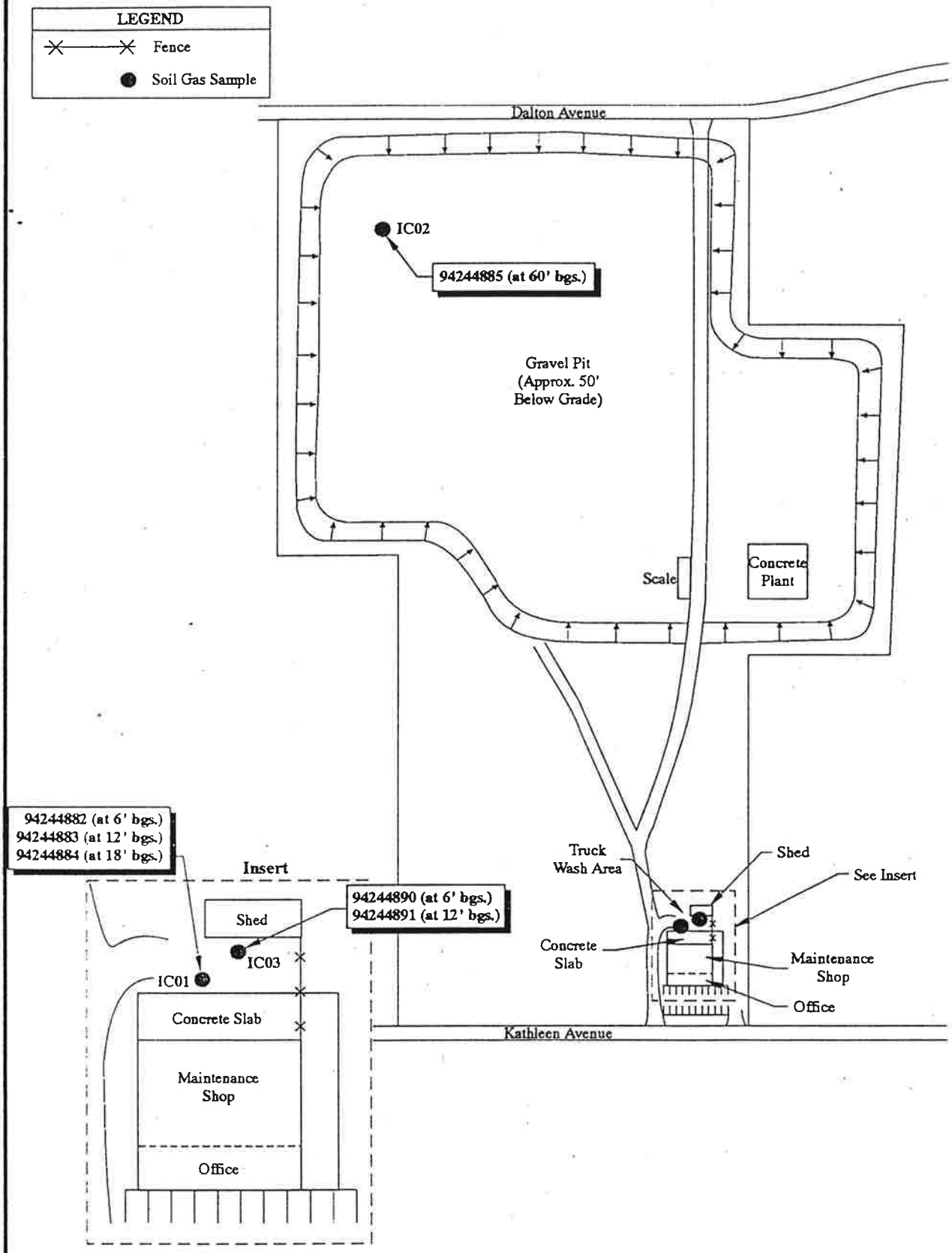
COEUR D'ALENE
GROUNDWATER ESI
Coeur d'Alene, Idaho

0 200' 400'
Approximate Scale in Feet

Figure 5-18
SITE MAP
INTERSTATE CONCRETE & ASPHALT

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	6-27-94	ZO3901	1944SM



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Seattle, Washington

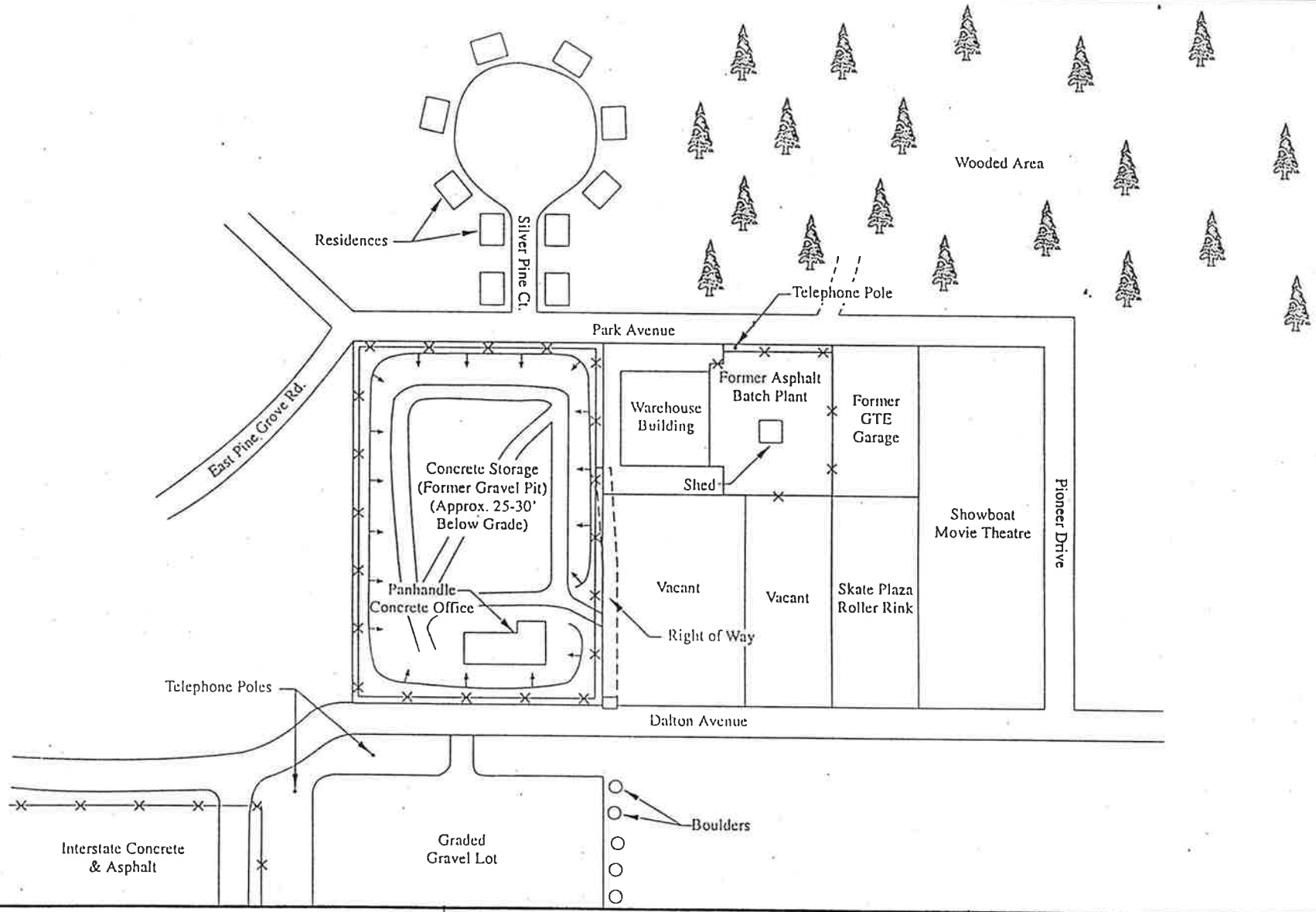
COEUR D'ALENE
GROUNDWATER ESI
Coeur d'Alene, Idaho

0 200' 400'
Approximate Scale in Feet

Figure 5-19
SAMPLE LOCATION MAP
INTERSTATE CONCRETE & ASPHALT

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	6-27-94	ZO3901	1944ASM

recycled paper



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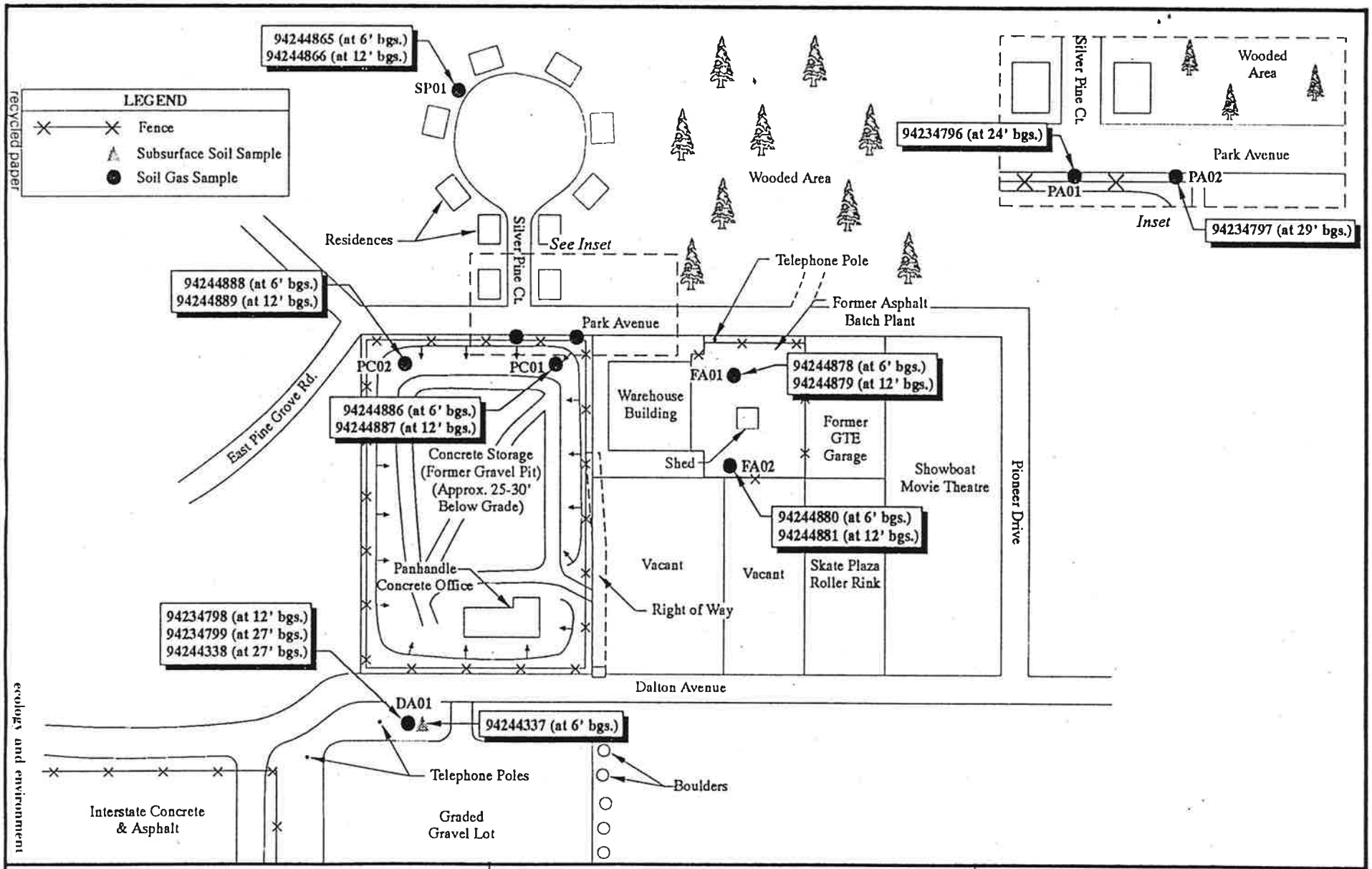
Seattle, Washington

COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

Not to Scale

Figure 5-20
SITE MAP
PARK/DALTON AVENUE AREA

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	6-27-94	ZO3901	1943SM



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Washington

COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

Not to Scale

Figure 5-21
SAMPLE LOCATION MAP
PARK/DALTON AVENUE AREA

Drawn By:	Date	TDD/Job No.	No.
AES	7-10-95	ZO3901	ASM

6. GROUNDWATER PATHWAY

This section provides a description of the geologic and hydrogeologic setting of CDA, and presents analytical data of groundwater samples collected during the ESI. This section also presents analytical results of soil and soil gas samples collected during monitoring well installation, soil gas samples collected from the wellhead of a monitoring well, and an oil sample collected from a private well.

6.1 GEOLOGIC SETTING

6.1.1 Regional Geology

The predominant geologic feature of the Coeur d'Alene area is the Purcell Trench, a structural and erosional trough extending southward from Canada to Coeur d'Alene, and then westward toward Spokane, Washington. This trough is bounded by mountains which locally rise to elevations exceeding 5000 feet above sea level. The Purcell Trench was deeply scoured by repeated advances of lobes of the Cordilleran Ice Sheet during the Pleistocene Epoch, and was subsequently filled to varying depths with sediments of glacial and fluvial origin. The present surface of this valley fill is referred to as the Rathdrum Prairie in Idaho (south of Athol), and as the Spokane Valley in Washington. The Rathdrum Prairie slopes gently southward from an elevation of approximately 2450 feet above sea level near Athol, Idaho to an elevation of approximately 2250 feet above sea level near Coeur d'Alene.

A brief description of the lithologic units and their geologic history are given below.

Pre-Tertiary Consolidated Rocks

Pre-Tertiary igneous and metamorphic rocks underlie the highlands east and west of the Rathdrum Prairie and south of the Spokane River. The Coeur d'Alene Mountains and Cabinet Mountains, east of the Purcell Trench, are underlain by variably metamorphosed sedimentary rocks of the Precambrian Belt Supergroup. West of the Purcell Trench, the Selkirk Mountains and the higher mountains west of Coeur d'Alene are underlain by Mesozoic granitic intrusive rocks and gneiss.

Columbia River Basalt Group (Miocene)

Flood basalts of the Miocene age Columbia River Basalt Group are present locally in the Coeur d'Alene area. At the time of eruption, these basalt flows extended eastward from eastern Washington toward Coeur d'Alene and northward up the Purcell Trench. Much of the basalt is believed to have been subsequently removed by fluvial and glacial erosion. Scattered exposures remain south of Coeur d'Alene and along the Spokane River west of Coeur d'Alene. Basalt has been reported in driller's logs for several water wells in the Rathdrum Prairie in the Coeur d'Alene area. However, the lateral extent of the basalt beneath the sedimentary fill of the Rathdrum Prairie remains unknown due to the small number of wells that penetrate to bedrock. Where it is exposed, the basalt is black to gray, massive to vesicular, and commonly fractured along columnar joints.

Latah Formation (Miocene)

Interlayered with basalt flows of the Columbia River Basalt Group are the lacustrine deposits of the Latah Formation. These clays, silts, and sands were deposited when basalt flows of the Columbia River Basalt Group blocked the westward flowing stream drainages in the Spokane Valley near Spokane, creating a lake that covered a large area including the present Spokane Valley and Rathdrum Prairie. Latah Formation sediments accumulated to thicknesses as great as 1500 feet locally, although 100 to 300 feet is more typical. In the Rathdrum Prairie, the Latah Formation is believed to exist presently as scattered erosional remnants beneath basalt and/or the overlying glacial and fluvioglacial sediments. Driller's

logs from the few wells that appear to have penetrated the Latah Formation in the Coeur d'Alene area report brown, blue, gray, or white clay, sandy clay, or sand.

Lower Sand and Gravel Unit (Pleistocene)

Overlying the Columbia River Basalt Group or Latah Formation, if present, are the glaciofluvial deposits of the Lower Sand and Gravel Unit. These unconsolidated sediments consist of sand and gravel, and to a lesser extent, silt and clay, which were deposited on outwash plains by meltwater streams draining the southward extending lobes of the Cordilleran Ice Sheet. Where exposed, the sediments are well-sorted and stratified. In eastern Washington, the Lower Sand and Gravel Unit is locally overlain by lacustrine silts and clays deposited by glacial Lake Columbia.

Upper Sand and Gravel Unit (Pleistocene)

The Upper Sand and Gravel Unit consists predominantly of sand and gravel, with lesser silt, clay, cobbles and boulders. These unconsolidated sediments were deposited during several major catastrophic flood events collectively known as the Spokane Floods, which spread across the Rathdrum Prairie and Spokane Valley and scoured the Channeled Scablands of eastern Washington during the Pleistocene Epoch. The total thickness of these deposits increases away from the margins of the Rathdrum Prairie and Spokane Valley to greater than 400 feet. Grain size generally increases away from the Rathdrum Prairie and Spokane Valley margins. Driller's logs for wells in the Coeur d'Alene area indicate the presence of clay layers locally. The lateral extent of these clay layers is uncertain, although they are generally not believed to be extensive or common.

Alluvium (Quaternary)

Streambed and floodplain deposits of the Spokane River and other drainages locally overly the Upper Sand and Gravel Unit. These deposits consist of sand, gravel, silt, and clay.

6.1.2 Site Geology

Geological logging was performed during the drilling of monitoring wells MW-1 and MW-2, which were drilled to total depths of 405 and 215 feet BGS, respectively. Lithologies encountered during drilling of MW-1 and MW-2 consist predominantly of sand and gravel of the Upper Sand and Gravel Unit, and possibly the Lower Sand and Gravel Unit as well for MW-1. Subordinate silt and clay were also encountered. The presence of clay layers was noted during drilling and sampling of MW-1 at the following depths:

- Between approximately 202 and 205 feet BGS: sand with clayey sand was noted in drilling returns, and sand with thin gray clay layers was noted in a split-tube soil sample;
- At approximately 221 feet BGS: sand with a minimum 0.3-foot-thick clay layer was noted in a split-tube soil sample;
- Between 255 and 257 feet BGS: sand with minor thin clay layers was noted in a split- tube soil sample;
- Between 265 and 272 feet BGS: clayey sand was noted in drilling cuttings;
- Between 295 and 302 feet BGS: sand with interstitial clay and sand with thin clay layers were noted in split-tube soil samples;
- Between 380 and 385 feet BGS: sand with nodules of clay was noted in drilling cuttings;
- Between 392 and 395 feet BGS: fine sand and silt with some clay were noted in drilling cuttings; and
- Between 402 and 405 feet BGS: sand with nodules of clay was noted in drilling cuttings.

Although the quantity of clay appeared to increase in drilling cuttings from MW-1 below 402 feet BGS relative to that above, the drilling cuttings remained predominantly sandy. This clay appears to exist as thin layers interbedded with sand. It is not clear whether these sands and clays are a relatively fine-grained zone of the Upper or Lower Sand and Gravel Unit or part of the Latah Formation, which may underlie the Lower Sand and Gravel Unit. During the drilling of MW-2, mMinor clay fragments mixed with sand were noted in drilling cuttings

between 156 and 160 feet BGS. The geologic logs for MW-1 and MW-2 are presented in Appendix B.

Geologic cross sections A-A' and B-B' were constructed with geologic logs for MW-1 and MW-2, as well as driller's logs for existing area wells, and are presented in Figures 6-1 and 6-2, respectively. Driller's logs were selected based upon availability, quality and quantity of detail provided, and geographic location. It should be noted that, although driller's logs provided useful geologic and hydrogeologic information, they were not necessarily prepared by trained geologists with stringent data objectives. Driller's logs for CDA area wells indicate predominantly sand and gravel (of the Upper, and possibly the Lower, Sand and Gravel Unit), with subordinate boulders, silt, and clay, to depths of up to 375 feet BGS. In several wells, including the Coeur d'Alene Hanley well and the Roy Armstrong well, drillers reported clay-bearing intervals several tens of feet in thickness. The lateral extent of these intervals is not known. Positive correlation of any given lithologic unit between wells is impossible due to the likelihood that the sediments are laterally discontinuous in nature (due to the predominant process of scouring and filling of channels operative during much of the Pleistocene when the most of the Upper and Lower Sand and Gravel Unit sediments were deposited), the large distances between the wells, and the uncertain quality of the driller's logs. It is possible that the clay-bearing intervals reported by drillers in the Coeur d'Alene Hanley well (between approximately 340 and 400 feet BGS) and the Roy Armstrong well (between approximately 297 and 347 feet BGS) are correlative and continuous between those wells (Figure 6-1). However, the presence of such a laterally continuous clay-bearing interval is not noted in other deep wells located in the area (Figure 6-2).

6.2 HYDROGEOLOGIC SETTING

6.2.1 Regional Hydrogeology

The following description of the hydrogeologic setting of the Coeur d'Alene Groundwater Contamination Site study area is based on the findings of this study and previous reports by Jehn and others (1988) and Sagstad (1977).

Underlying the Rathdrum Prairie and Spokane Valley is the Rathdrum Prairie-Spokane Valley Aquifer system, one of the most prolific aquifers in the United States. This aquifer is

the primary source of drinking water for Spokane, Washington and Coeur d'Alene, Post Falls, and Hayden Lake, Idaho.

The principal geologic units comprising the aquifer are the Upper Sand and Gravel Unit and the Lower Sand and Gravel Unit, where present. Basalt, where present and fractured, may locally act as a low yield aquifer. Intervening clay layers within and/or between the Upper Sand and Gravel Unit and Lower Sand and Gravel Unit may act as aquitards locally. The lateral extent of these layers is not known. The clays of the Latah Formation, where present and of sufficient thickness, act as an aquitard. The metamorphic and igneous Pre-Tertiary Consolidated Rocks act as an aquitard, and, in the absence of Latah Formation clays and/or unfractured basalt, serve as the lower and lateral boundary of the Rathdrum Prairie-Spokane Valley Aquifer system.

Assuming that the Latah Formation clays, unfractured basalt, and intervening clay layers of the Upper Sand and Gravel Unit and Lower Sand and Gravel Unit are laterally discontinuous, the Rathdrum Prairie-Spokane Valley Aquifer system can be treated on a regional scale as a single, though inhomogeneous, unconfined aquifer.

Groundwater flow direction in the Rathdrum Prairie-Spokane Valley Aquifer in the Coeur d'Alene area is generally northward just north of Coeur d'Alene Lake and northwestward and westward through the Spokane Valley. In the northern part of the Rathdrum Prairie, groundwater flows southward. The northward flow of groundwater from Coeur d'Alene and the southward flow of groundwater from the north converge northwest of Coeur d'Alene and flow westward through the Spokane Valley aquifer. Hayden Lake, located to the northeast of Coeur d'Alene, appears to contribute to the westward component of groundwater flow of groundwater north of Coeur d'Alene. Depth to the water table in the Coeur d'Alene area ranges from approximately 170 to 300 feet BGS. Reported transmissivity values for the aquifer range from 270,000 to 13,000,000 ft^2/day.

6.2.2 Site Hydrogeology

Geological logs for monitoring wells MW-1 and MW-2 indicate that to a depth of at least 402 feet BGS in the area of Deming industries, the subsurface consists predominantly of sand and gravel of the Upper Sand and Gravel Unit and possibly the Lower Sand and Gravel Unit.

However, thin clay layers and interstitial clay within sand were noted during drilling of both MW-1 and MW-2 at depths ranging from 156 feet to 405 feet BGS. The clay or clay-bearing intervals noted are thin and probably of limited lateral continuity. Nonetheless, their presence likely acts to impede the vertical migration of groundwater and dense non-aqueous phase liquids (DNAPLs) on a local scale.

As discussed above, driller's logs indicate that, although sand and gravel are the predominant lithologies encountered during drilling of CDA area wells, clay-bearing zones were also encountered. Depths of these clay-bearing intervals range from approximately 60 feet BGS (Coeur d'Alene Linden well, Figure 6-1) to between approximately 340 and 400 feet BGS (Coeur d'Alene Hanley well, Figure 6-1). The lateral extent of these clay-bearing layers is not known. It appears likely that some of these clay-bearing intervals result in vertical segregation of the aquifer at least on a local scale. It is possible that such segregation also occurs on a larger scale. For example, it is possible that the clay-bearing intervals reported in the Coeur d'Alene Hanley well, Roy Armstrong well, and Martin Brooks well are correlative and continuous between those wells, resulting in segregation of the aquifer in the northwest portion of the study area (Figure 6-1). However, the absence of correlative clay-bearing intervals in other deep wells in the same area (Figure 6-2) does not support such a conclusion.

Water levels were measured in selected wells during Phase I and Phase III field activities in order to better understand the groundwater flow regime in the CDA area. Water levels were measured on June 14 and December 16, 1994. Results of these water level measurements are presented in Table 6-1. Water levels varied only slightly between the summer and winter measurements. Depth to groundwater ranged from approximately 170 feet BGS in the southern portions of the CDA area to almost 300 feet BGS in the northern portion of the CDA area. Groundwater elevation contour maps generated from these data are presented in Figures 6-3 and 6-4. It was assumed in constructing the water elevation maps that the wells used are screened in the same aquifer, and that the aquifer is unconfined and continuous on the scale of the study area. Findings of the ESI support previous studies indicating that groundwater flows generally toward the north in the southern portion of the study area, and toward the northwest and west in the northern portion of the study area. Flow of groundwa-

ter from Hayden Lake, located northeast of the CDA area, appears to contribute a westward component to the groundwater flow in the Coeur d'Alene area. Hydraulic gradient ranges from approximately 7 feet/mile to greater than 35 feet/mile over the CDA area.

6.3 SAMPLE LOCATIONS AND ANALYTICAL RESULTS

6.3.1 Groundwater Sampling from Domestic and Municipal Wells

Phase I

During the first phase of field activities conducted the weeks of June 6 and 13, 1994, groundwater samples were collected from 26 wells in the site area and analyzed on site in the ESAT mobile laboratory for 1,1-DCE; cis- and trans-1,2-DCE; and TCE. Locations of these wells are shown in Figure 6-5. Field analytical results are presented in Table 6-2 and Figure 6-6. TCE was detected in four wells: the Sunrise Terrace Association well system (estimated 24 μg/L), the Steve Meyer well (estimated 0.8 μg/L), the Robert Yandt well (estimated 0.4 μg/L), and the Manuel Schneidmiller irrigation well (estimated 2.6 μg/L).

Confirmation samples were collected from these four wells and submitted to EPA's Region 10 laboratory for VOC analysis (Method 8240). Laboratory results of confirmation samples are presented in Table 6-3 and Figure 6-6. TCE was detected in the Sunrise Terrace Association well (13.4 μg/L) and the Schneidmiller irrigation well (estimated 0.13 μg/L). TCE was not detected in the Steve Meyer well or the Robert Yandt well.

The Sunrise Terrace well sample also contained 1,2-Dichloroethane (1.2 μg/L) and 4-methyl-2-pentanone (estimated 0.16 μg/L), however the trip blank sample (94234301) submitted for analysis with the Sunrise Terrace well sample contained these analytes at greater concentrations. Another confirmation sample (94234300) submitted with the same shipment also contained these analytes. It is likely that these analytes are the result of contamination that was present in the sample containers, or that occurred during shipping.

In addition to TCE, the confirmation sample from the Schneidmiller well (94244347) also contained low concentrations of chlorinated aromatic compounds, including: 1,2-dichlorobenzene (estimated 0.083 μg/L); chlorobenzene (estimated 0.14 μg/L); 1,3-dichlorobenzene (estimated 0.096 μg/L); and 1,4 dichlorobenzene (estimated 0.093 μg/L). Chloro-

benzene (estimated 0.15 μg/L) also was detected in a sample collected from the Robert Yandt well (94244349); however, the duplicate sample (94244348) did not contain detectable levels of chlorobenzene. The trip blank sample (94244350) for this shipment did not contain detectable levels of contaminants.

It is not known why some samples analyzed in the field laboratory indicated the presence of TCE while samples collected from the same well and analyzed in the fixed laboratory did not. It could be that the detector used during field analysis (ECD) was more sensitive to TCE than the detector used during fixed laboratory analysis (GC/MS). The concentrations detected during field analysis were very low - much lower than the 1 μg/L detection limit. Background "noise" could have been misinterpreted as positive TCE concentrations. Another possible explanation is that the samples were not truly duplicate. Confirmation samples were collected at the end of the field event. Because the field samples and confirmation samples were not collected at the same time, slight variations in sampling technique or sample chemistry are possible.

Phase III

During the third phase of field activities conducted from December 12 to December 20, 1994, groundwater samples were collected from the City of Coeur d'Alene Hanley and Locust wells, the north and south wells of the Sunrise Terrace Association well system, the Steve Meyer well, the Robert Yandt well, and the new High School well. The locations of these wells are shown in Figure 6-5. It was not possible to collect samples from the City of Coeur d'Alene Linden well or the Schneidmiller well because the wells had been closed for the winter. In addition to the domestic and municipal wells sampled, a groundwater sample was collected from the presently unused Magnuson well. Analytical results for the Magnuson well sample are discussed in Section 6.3.4.

Samples were analyzed for VOCs at EPA's Region 10 laboratory (Method 8260). Analytical results are presented in Table 6-4 and Figure 6-6. TCE was detected in samples from both the north well (94504432) and south well (94504433) of the Sunrise Terrace Association well system at concentrations of 10.5 μg/L (estimated) and 6.6 μg/L, respectively. TCE was also detected in the sample from the Coeur d'Alene Hanley well (94504435) at

a concentration of 2.6 μg/L. TCE was not detected in samples from the other wells. PCE was detected in the sample from the Robert Yandt well (94504438) at an estimated concentration of 0.19 μg/L.

Samples from all seven wells contained 1,2-dichloroethane at concentrations ranging from 0.23 μg/L (estimated) to 0.53 μg/L. However, 1,2-dichloroethane was detected in the associated trip blanks at higher concentrations. Samples from all seven wells also contained 4-methyl-2-pentanone at concentrations ranging from 0.15 μg/L (estimated) to 1.7 μg/L (estimated). This compound was detected in the associated trip blanks at higher concentrations than in all but one sample. The presence of 1,2-dichloroethane and 4-methyl-2-pentanone in the samples is likely attributable to contamination that was present in the sample containers or that occurred during shipping.

The following additional compounds were detected: 1-methylethyl-benzene in the sample from the new High School (94504437) at an estimated concentration of 0.47 μg/L; and 2-hexanone in the sample from the Steve Meyer well (94504439) at an estimated concentration of 0.62 μg/L. However, the trip blank associated with sample 94504439 also contained 2-hexanone at an estimated concentration of 0.29 μg/L.

Unlike the Phase I sample from the Schneidmiller well (94244347), the Phase III sample from the Schneidmiller well did not contain detectable levels of chlorinated aromatic hydrocarbons.

6.3.2 Soil, Soil Gas, and Groundwater Sampling During Monitoring Well Installation

Monitoring Well MW-1

Monitoring well MW-1 was installed at a location between the former primary and secondary drywells at Deming Industries (Figures 6-7 and 6-8). Eleven soil gas samples, 16 subsurface soil samples, and 17 groundwater samples were collected during the drilling of MW-1. Samples were analyzed in the ESAT mobile field laboratory for: 1,1-DCE; cis- and trans-1,2-DCE; TCE; and vinyl chloride. At least 10% of the soil and groundwater samples were submitted to EPA's Region 10 laboratory for confirmation analysis for volatile organics (EPA Method 8260). Results of the sampling conducted during MW-1 installation are presented in Tables 6-5 and 6-6 and Figure 6-9.

TCE or its degradation products were detected in soil gas samples collected from 40 feet BGS (cis-1,2-DCE at approximately 0.11 μg/L) and 165 feet BGS (TCE at approximately 0.79 μg/L).

TCE or its breakdown products were detected in soil samples analyzed by the ESAT mobile field laboratory from the following depths: 20 feet BGS (TCE at approximately 0.26 μg/kg); 40 feet BGS (1,1-DCE at approximately 0.08 μg/kg); 80 feet BGS (TCE at approximately 0.23 μg/kg); 115 feet BGS (TCE at 0.82 μg/kg); 135 feet BGS (TCE at approximately 21.3 μg/kg, 1,1-DCE at 4.0 μg/kg, and trans-1,2-DCE at 3.3 μg/kg); 155 feet BGS (TCE at approximately 7.5 μg/kg); 165 feet BGS (TCE at approximately 12.4 μg/kg, and 1,1-DCE at 1.22 μg/kg); 175 feet BGS (TCE at 1.32 μg/kg); 185 feet BGS (TCE at 1.52 μg/kg); 195 feet BGS (TCE at approximately 22.7, 22.8, and 26.2 μg/kg; 1,1-DCE at 0.52 and 0.95 μg/kg; and trans-1,2-DCE at approximately 0.2 μg/kg); and 295 feet BGS (TCE at approximately 0.44 μg/kg and trans-1,2-DCE at 1.2 μg/kg).

Confirmation soil samples were collected at the following depths and analyzed by EPA's Region 10 laboratory; 80, 165, and 195 feet BGS. Results are presented in Table 6-6 and Figure 6-9. TCE or its breakdown products were detected in confirmation soil samples from all three depths at the following concentrations: 80 feet BGS (TCE at 1.7 μg/kg); 165 feet BGS (TCE at 25.4 μg/kg, 1,1-DCE at approximately 0.87 μg/kg, and trans-1,2-DCE at approximately 0.18 μg/kg); and 195 feet BGS (TCE at 42.9 μg/kg). In addition, other CAH compounds were detected in soil samples from all three depths at the following concentrations: 80 feet BGS (PCE at approximately 0.70 μg/kg); 165 feet BGS (PCE at approximately 0.96 μg/kg and 1,1,1-TCA at approximately 0.45 μg/kg); and 195 feet BGS (PCE at approximately 1.5 μg/kg). Additional chlorinated compounds detected include: chloroform (165 and 195 feet BGS); chloromethane (165 feet BGS); and dichlorodifluoromethane (80 and 165 feet BGS). Other VOCs, detected only in the sample from 165 feet BGS, are: 2-hexanone; 4-methyl-2-pentanone; ethylbenzene; MP-xylene; toluene; and total xylenes.

Groundwater samples were collected at approximately 20-foot intervals from the water table (approximately 195 to 405 feet BGS) and analyzed in the ESAT mobile laboratory for 1,1-DCE, cis- and trans-1,2-DCE, TCE, and vinyl chloride. Results are presented in Tables 6-5 and 6-6 and Figure 6-9. TCE or its breakdown products were detected in

groundwater samples collected from the following depths: 195 feet BGS (TCE at approximately 44.0 and approximately 280 μg/L; cis-1,2-DCE at approximately 0.2 μg/L; trans-1,2-DCE at approximately 0.2 and 2.2 μg/L; 1,1-DCE at approximately 0.3 and approximately 0.8 μg/L; and vinyl chloride at 3.08 and 6.6 μg/L); 215 feet BGS (TCE at approximately 0.3 μg/L); 255 feet BGS (TCE at approximately 2.6 μg/L); and 295 feet BGS (TCE at approximately 1.9 μg/L). The results of the sample collected at 215 feet BGS may be questionable due to the presence of TCE in the rinsate sample collected from the groundwater sampling equipment.

A confirmation groundwater sample (94394362) was collected at 195 feet BGS and sent to EPA's Region 10 laboratory for VOC analysis (EPA Method 8260). This sample was a duplicate sample of the field analyzed sample 94394363. TCE and cis-1,2-DCE were detected at concentrations of 1510 μg/L and 0.32 μg/L (estimated), respectively. Additionally, PCE and 1,1,1-TCA were detected at concentrations of 26.7 μg/L and 0.66 μg/L (estimated), respectively. Other compounds detected are: 1,1,2-trichloroethane; 1,2-dichloroethane; carbon disulfide; and chloroform.

As indicated above, the field-analyzed groundwater sample contained approximately 280 μg/L TCE, while the confirmation sample contained 1,510 μg/L TCE. A likely explanation for the apparent discrepancy in the TCE levels is the inherent difficulty in collecting a truly duplicate sample, especially for volatile organic compounds.

In summary, results of soil and soil gas samples from the unsaturated zone appear to trace the downward migration of TCE and its breakdown products from the surface to the water table. The high concentrations of TCE in soil and groundwater samples from 195 feet BGS, just below the water table, are likely the result of accumulation of these compounds at the water table. Accumulation of these compounds at this depth is also likely attributable to the presence of thin clay layers between 202 and 205 feet BGS, which may have impeded the downward migration of the DNAPLs through the saturated zone (Figure 6-9). TCE or its breakdown products were also detected below 205 feet BGS, although at relatively low concentrations. A groundwater sample from 255 feet BGS, and a groundwater and a soil sample from 295 feet BGS which contained TCE were collected from immediately above thin clay layers (Figure 6-9).

Monitoring Well MW-2

Monitoring well (MW-2) was installed at a location approximately 265 feet south, and hydraulically upgradient, of MW-1 (Figure 6-8). Although the FOWP/QAPjP for Phase II activities (E & E 1994c) specified that the second and optional third wells be drilled in downgradient locations, an upgradient location was selected in order to provide data on background concentrations of TCE and its breakdown products. After investigating several possible upgradient locations, it was decided to drill MW-2 in the parking lot of Coeur d'Alene Laundry Center and Dry Cleaning based upon its close proximity to MW-1, the feasibility of access of the drilling equipment, and the willingness of the owner (Mr. Jack Wardian) to allow drilling activities to occur on his property.

Subsurface soil samples were collected from four depths during drilling of MW-2 corresponding to the depths of confirmation samples collected from MW-1 (20, 80, 165, and 198 feet BGS). A groundwater sample also was collected from just below the water table at approximately 198 feet BGS. All samples were analyzed by EPA's Region 10 laboratory for volatile organics (EPA Method 8260). Results are presented in Table 6-7 and Figure 6-10.

TCE, trans-1,2-DCE, and 1,1-DCE were detected in soil samples from all four depths at the following concentrations: 20 feet BGS (TCE at approximately 0.77 μg/kg; trans-1,2-DCE at approximately 0.35 μg/kg; and 1,1-DCE at approximately 0.21 μg/kg); 80 feet BGS (TCE at approximately 1.1 μg/kg; trans-1,2-DCE at approximately 0.53 μg/kg; and 1,1-DCE at 0.86 μg/kg); 165' (TCE at 7.9 μg/kg; trans-1,2-DCE at approximately 0.52 μg/kg; and 1,1-DCE at approximately 0.37 μg/kg); and 198' and 199 feet BGS (TCE at 4.7 and 9.4 μg/kg; trans-1,2-DCE at approximately 0.46 μg/kg; and 1,1-DCE at approximately 0.22 and approximately 0.23 μg/kg). Other CAH compounds detected are: 1,1,1-TCA (detected in all samples at concentrations ranging from approximately 0.39 to approximately 1.0 μg/kg); 1,1,2,2-PCA (detected in all samples at concentrations ranging from approximately 0.43 to approximately 0.78 μg/kg); and PCE (detected in the sample from 80 feet BGS at approximately 0.10 μg/kg). Other chlorinated compounds detected in soil samples are: 1,3-dichlorobenzene; chloroform; cis-1,3-dichloropropene; and dichlorofluoromethane.

The groundwater sample collected from 198 feet BGS (94414555) contained TCE at 79.6 μg/L. Other compounds detected are chloromethane and 2-hexanone.

6.3.3 Groundwater Sampling from Monitoring Wells

During Phase III field activities, dedicated pumps were installed in MW-1 and MW-2. Groundwater samples were collected from each well and submitted to EPA's Region 10 laboratory for volatile organics analysis (EPA Method 8260). Analytical results are presented in Table 6-8 and Figure 6-6.

TCE was detected in the sample from MW-1 (94504420) at 648 μg/L. TCE was also detected in both samples from MW-2 (94504421 and duplicate sample 94504422) at concentrations of 153 and 160 μg/L. PCE was also detected in both MW-1 and MW-2 at concentrations of approximately 4.7 μg/L and approximately 0.15 μg/L, respectively. No other VOCs were detected in the sample from MW-1. The following additional compounds were detected in the samples from MW-2: 1,1,1-TCA (approximately 0.12 μg/L); 1,1-DCA (approximately 0.059 μg/L); 1,2-dichloroethane (0.59 μg/L); dichloromethane (20 μg/L); and 4-methyl-2-pentanone (approximately 0.18 μg/L). 1,2-dichloroethane and 4-methyl-2-pentanone were also detected in the trip blanks associated with these samples.

6.3.4 Groundwater and Oil Sampling from the Magnuson Well

In lieu of installing a third monitoring well downgradient of Deming Industries and upgradient of the Sunrise Terrace well system, it was decided to sample groundwater from the presently unused Magnuson well. The Magnuson well is 12 inches in diameter, 230 feet deep, and has a static water level of approximately 206 feet BGS (December 16, 1994). The well is located on Neider Avenue across from the eastern entrance of the Kmart parking lot, and is approximately 1,300 feet north-northwest of MW-1 (Figure 6-5).

During Phase II field activities, the original pump was removed in preparation for collection of a groundwater sample. The presence of oil in the well casing precluded collection of a water sample at this time. A sample of the oil (94424553) was collected and sent to EPA's Region 10 laboratory for Method 8260 VOC analysis and Method 8080 PCB analysis. Results are presented in Tables 6-9 and 6-10. No CAH compounds were detected. Total PCBs were present at 41.2 micrograms per gram (μg/g).

During Phase III field activities, a groundwater sample (94504441) and a second oil sample (94504424) were collected from the Magnuson well. The samples were submitted to

EPA's Region 10 laboratory for Method 8260 VOC analysis (oil and water samples) and Method 8080 PCB analysis (oil sample). Results are presented in Tables 6-9 and 6-10. TCE was detected in the oil sample and the groundwater sample at estimated concentrations of 23.3 μg/L and 0.05 μg/L, respectively. No other CAH compounds were detected in either the oil or groundwater sample. The following additional compounds detected in the groundwater sample are likely attributable to the presence of oil in the well: various benzene compounds; 2-hexanone; xylenes; toluene; naphthalene; 4-methyl-2-pentanone; and 2-propanone. The origin of 1,2-dichloroethane and 1,2-dichlorobenzene is not known. Total PCBs were detected in the oil sample at 10.2 μg/g.

6.3.5 Soil Gas Sampling from Monitoring Well MW-1

The vapor sample (94424551) collected from within the MW-1 well at the close of Phase II field activities was submitted to ESAT's laboratory for analysis for TCE, cis- and trans-1,2-DCE, PCE, and vinyl chloride. Results are presented in Table 6-5. None of the target compounds were detected above the detection limit of 0.01 μg/L.

Four soil gas samples (94504426 through 94504429) were collected from the wellhead of MW-1 during Phase III of field activities and submitted to EPA's Region 10 laboratory for Method 8260 VOC analysis. Analytical results are presented in Table 6-11. TCE was detected in the first three samples at estimated concentrations ranging from 7.4 μg/L to 15.8 μg/L. Other CAH compounds detected in the first three samples are 1,1,1-TCA and PCE. 1,1,1-TCA was detected at concentrations ranging from 0.07 μg/L to 0.013 μg/L. PCE was detected at estimated concentrations of 0.54 μg/L to 1.6 μg/L. Additional compounds detected in the first three samples include chloromethane, dichloromethane, trichlorofluoromethane, and various aromatic compounds. Besides TCE, detected at a relatively low concentration of 0.016 μg/L, no VOCs were detected in the fourth soil gas sample. Based upon the abrupt decrease in TCE concentration and non-detection of other VOCs in the fourth sample, it appears likely that the vapor sampling apparatus was not functioning as intended during the collection of this sample.

6.3.6 Groundwater Sampling from Monitoring Wells for Metals

During Phase III of field activities, groundwater samples were collected from monitoring wells MW-1 and MW-2 for total metals analysis. Samples were submitted to EPA's Region 10 laboratory for TAL metals analysis. Results are presented in Table 6-12.

Arsenic was detected in the sample from MW-1 (94514610) at a concentration of 35.6 μg/L. Arsenic was also detected in the sample from MW-2 (94516411) at approximately 3.4 μg/L, which is typical of the arsenic concentrations in groundwater in the Coeur d'Alene area (EPA 1995). The reason for the apparently elevated arsenic concentration in groundwater from MW-1 is not clear.

Lead was detected in the laboratory duplicate of the MW-1 sample at an estimated concentration of 0.54 μg/L, and in the sample from MW-2 at a concentration of 18.3 μg/L. The reason for the apparently elevated concentration of lead in groundwater from MW-2 is not clear.

6.3.7 Soil Sampling from Monitoring Wells for Metals

Soil samples, collected during drilling of MW-1 and MW-2 and previously submitted to EPA's Region 10 laboratory for Method 8260 VOC analysis during Phase II field activities, were retrieved from refrigerated storage and analyzed for metals. The samples were analyzed for TAL metals, exclusive of mercury and cyanide, in accordance with the Sample Plan Alteration Form for the FOWP/QAPjP for Phase II activities (E & E 1994c). Samples from MW-1 were collected at the following depths: 80 feet BGS (94384492); 165 feet BGS (94384502); and 195 feet BGS (94394364). Samples from MW-2 were collected at the following depths: 20 feet BGS (94414550); 80 feet BGS (94414551); 165 feet BGS (9441455-2); 198 feet BGS (94414553); and 199 feet BGS (94414554). Analytical results are presented in Appendix E.

Table 6-1

WATER LEVEL MEASUREMENT DATA
PHASE I AND PHASE III FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO

Well Number	Reference Point	Reference Point Elevation (feet above MSL)	June 14, 1994		December 16, 1994	
			Water Depth (feet)	Water Elevation (feet above MSL)	Water Depth (feet)	Water Elevation (feet above MSL)
MW-1	Top/access port	2240.46	NA	NA	194.63	2045.83
MW-2	Top/access port	2239.57	NA	NA	192.44	2047.13
28	Top/well casing	2288.96	294.82	1994.14	296.43	1992.53
56	Top/access port	2268.53	262.70	2005.83	263.18	2005.35
58	Top/access port	2225.24	NA	NA	170.88	2054.36
59	Top/pump pedestal	2239.06	193.65	2045.41	190.48	2048.58
60	Top/chlorine feeder port	2222.37	NA	NA	167.48	2054.89
68	Top/well casing	2209.46	170.50	2038.96	NA	NA
105	Top/access port	2225.24	218.88	2006.36	219.44	2005.80
106	Top/access port	2255.22	251.60	2003.62	250.57	2004.65

MSL - Mean sea level.

Table 6-2
GROUNDWATER SAMPLES FIELD ANALYTICAL RESULTS - DOMESTIC AND MUNICIPAL WELLS
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Lab #	Location #	Owner/Location	1,1-DCE	trans-1,2-DCE	cis-1,2-DCE	TCE
94234710[b]	WL04	Sunrise Terrace Wells[c]	1 UF	1 UF	1 UF	24 JF
94234724	WL05	Lola Corporation - Near Oak Crest Trailer Park	1 UF	1 UF	1 UF	1 UF
94244800	WL08	Dr. Jones - Ironwood Properties	1 UF	1 UF	1 UF	1 UF
94244801	WL10	Prairie Animal Hospital	1 UF	1 UF	1 UF	1 UF
94234718	WL28	Roy Armstrong	1 UF	1 UF	1 UF	1 UF
94234714	WL46	U.S. Forest Service domestic well	1 UF	1 UF	1 UF	1 UF
94234712[e]	WL50	Robert Yandt	1 UF	1 UF	1 UF	0.4 JF
94234720	WL55	Rich Brown - Dexco Mini Mart	1 UF	1 UF	1 UF	1 UF
94234709	WL59	Coeur d'Alene Municipal well - 4th and Best	1 UF	1 UF	1 UF	1 UF
94234721	WL61	Bill Zenetti - Turrell well	1 UF	1 UF	1 UF	1 UF
94234703	WL64	C & S Transmission	2 UF	10 UF	10 UF	2 UF
94234725	WL68	Kootenai County Landfill	1 UF	1 UF	1 UF	1 UF
94234719	WL70	Manuel Schneidmiller	1 UF	1 UF	1 UF	2.6 JF
94234723	WL78	Great Northern Equipment	1 UF	1 UF	1 UF	1 UF
94234705	WL81	Avondale Irrigation Dist. - Finucan	2 UF	10 UF	10 UF	2 UF
94234704	WL83	Avondale Irrigation Dist. - Mile Ave.	2 UF	10 UF	10 UF	2 UF
94234708	WL88	Coeur d'Alene Industrial Park	2 UF	10 UF	10 UF	2 UF
94234711[d]	WL96	Steve Meyer - AID Well	1 UF	1 UF	1 UF	0.8 JF
94234717	WL97	Rocklynn Getz	1 UF	1 UF	1 UF	1 UF
94234706	WL98	H & D Trailer Park - Spicket outside near well	2 UF	10 UF	10 UF	2 UF
94234707[a]	WL98	H & D Trailer Park - Spicket outsid[illegible] age	2 UF	10 UF	10 UF	[illegible]

Table 6-2
GROUNDWATER SAMPLES FIELD ANALYTICAL RESULTS - DOMESTIC AND MUNICIPAL WELLS
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Lab #	Location #	Owner/Location	1,1-DCE	trans-1,2-DCE	cis-1,2-DCE	TCE
94234713	WL105	Jay Davitt - Memorial Funeral Home	1 UF	1 UF	1 UF	1 UF
94244802	WL106	U.S. Forest Service - new irrigation well	1 UF	1 UF	1 UF	1 UF
94234715	WL107	U.S. Forest Service greenhouse well	1 UF	1 UF	1 UF	1 UF
94234722	WL108	Bob Townsend - Quad Park well	1 UF	1 UF	1 UF	1 UF
94244803	WL110	New High School well	2 UF	2 UF	2 UF	2 UF

a - Results confirmed at EPA Region 10 laboratory with sample 94234300 (see Table 6-6).
b - Results confirmed at EPA Region 10 laboratory with sample 94234302 (see Table 6-6).
c - The Sunrise Terrace well system consists of two wells (the north well and the south well) situated approximately 20 feet from each other. It was not possible to determine which well was being pumped at the time of sampling, as the pump system as it exists now does not distinguish between wells.
d - Results confirmed at EPA Region 10 laboratory with sample 94244346 (see Table 6-6).
e - Results confirmed at EPA Region 10 laboratory with sample 94244348 and 94244349 (duplicates) (see Table 6-6).
f - Results confirmed at EPA Region 10 laboratory with sample 94244347 (see Table 6-6).

F - The "F" qualifier indicates the associated numerical value is an estimate due to the use of less-rigorous FASP methods.
U - The analyte was not detected. The associate numerical value is the sample detection limit.

µg/L - Micrograms per liter of water

Table 6-3

CONFIRMATION ANALYTICAL RESULTS OF GROUNDWATER SAMPLES COLLECTED FROM DOMESTIC AND MUNICIPAL WELLS
EPA REGION 10 LABORATORY
PHASE I FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	94234301	94234300	94234302	94244350	94244347	94244348	94244349	94244351
Well Number	Trip Blank	WL98	WL04	Trip Blank	WL70	WL50	WL50 (duplicate)	WL96
Analyte								
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	0.083 J	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	3.5	0.48 J	1.2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
4-Methyl-2-Pentanone	0.17 J	0.23 J	0.16 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	0.14 J	1.0 U	0.15 J	1.0 U
1,3-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	0.096 J	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U	1.0 U	0.093 J	1.0 U	1.0 U	1.0 U
Chloromethane	0.36 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	1.0 U	1.0 U	13.4	1.0 U	0.13 J	1.0 U	1.0 U	1.0 U

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected. The associate numerical value is the sample detection limit.

µg/L - Micrograms per liter of water.

Table 6-4

GROUNDWATER SAMPLES ANALYTICAL RESULTS - DOMESTIC AND MUNICIPAL WELLS
EPA REGION 10 LABORATORY
PHASE III FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	94504431	94504432	94504433	94504434	94504435	94504436	94504437	94504438	94504439
Location/Description	Trip Blank (94504432, 94504433)	WL04 Sunrise Terrace North Well	WL04 Sunrise Terrace South Well	Trip Blank (94504435/ 94504439)	WL56 CDA Hanley	WL58 CDA Locust	WL110 New High School	WL50 Robert Yandt	WL96 Steve Meyer (AID)
Analyte									
1,2-Dichloroethane	0.4 J	0.23 J	0.31 J	1.1	0.3 J	0.53	0.23 J	0.32 J	0.49 J
2-Pentanone, 4-methyl	0.61 J	0.16 J	0.21 J	1.4 J	1.7 J	0.93 J	1.2 J	0.77 J	0.15 J
Trichloroethene	0.5 U	10.5 J	6.6	0.5 U	2.6	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone	5.0 UJ	5.0 UJ	5.0 UJ	0.29 J	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	0.62 J
Benzene, 1-methylethyl	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.47 J	0.5 U	0.5 U
Tetrachloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.19 J	0.5 U

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected at or above the reported result.
UJ - The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.

µg/L - Micrograms per liter of water

Table 6-5

FIELD ANALYTICAL RESULTS OF SOIL, SOIL GAS, AND WATER SAMPLES - MONITORING WELL MW-1 INSTALLATION
PHASE II FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L for soil gas and water, µg/kg for soil)

Depth (feet BGS)	Sample #	Matrix	Time	Vinyl Cl	1,1-DCE	Trans-1,2-DCE	Cis-1,2-DCE	TCE
September 20, 1994								
20'	94384480	Soil	0845	2.0 UF	0.5 UF	0.5 UF	1.0 UJF	0.26 JF
40'	94384481	Soil Gas	1210	0.01 UF	0.01 UF	0.01 UF	0.11 NF	0.01 UF
40'	94384482	Soil	1215	1.0 UF	0.08 JF	0.5 UF	0.5 UJF	0.5 UF
60'	94384483	Soil Gas	1400	0.01 UF	0.01 UF	0.01 UF	0.01 UF	0.01 UF
60'	94384484	Soil	1410	1.0 UF	0.5 UF	0.5 UF	0.5 UJF	0.5 UF
80'	94384485	Soil Gas	1615	0.01 UF	0.01 UF	0.01 UF	0.01 UF	0.01 UF
80'	94384486[a]	Soil	1635	2.0 UF	0.5 UF	0.5 UF	1.0 UJF	0.23 JF
85'	94384487	Soil Gas	1753	Soil Gas tube bent; could not be analyzed.				
85'	94384488	Soil	1800	1.0 UF	0.5 UF	0.5 UF	0.5 UJF	0.5 UF
September 21, 1994								
Blank	94384489	Soil Gas	0900	0.02 UF	0.01 UF	0.01 UF	0.02 UF	0.01 UF
105'	94384490	Soil Gas	1045	0.02 UF	0.01 UF	0.01 UF	0.02 UF	0.01 UF
105'	94384491	Soil	1050	1.0 UF	0.5 UF	0.5 UF	0.5 UJF	0.5 UF
September 22, 1994								
115'	94384494	Soil Gas	1055	0.01 UF	0.01 UF	0.01 UF	0.01 UF	0.01 UF
115'	94384495	Soil	1100	2.0 UF	0.5 UF	0.5 UF	1.0 UF	0.82 NF
135'	94384496	Soil Gas	1415	0.01 UF	0.01 UJF	0.01 UF	0.01 UF	0.01 UF
135'	94384497	Soil	1430	2.0 UF	4.0 NF	3.3 NF	1.0 UF	21.3 NJF
155'	94384498	Soil Gas	1604	0.01 UF	0.01 UJF	0.01 UF	0.01 UF	0.01 UF
155'	94384499	Soil	1615	0.5 UF	0.5 UF	0.5 UF	0.5 UF	7.5 NJF

Table 6-5

FIELD ANALYTICAL RESULTS OF SOIL, SOIL GAS, AND WATER SAMPLES - MONITORING WELL MW-1 INSTALLATION
PHASE II FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L for soil gas and water, µg/kg for soil)

Depth (feet BGS)	Sample #	Matrix	Time	Vinyl Cl	1,1-DCE	Trans-1,2-DCE	Cis-1,2-DCE	TCE
Rinsate	94384500	Water	1730	1.0 UF	1.0 UF	1.0 UF	1.0 UF	1.0 UF
165'	94384501	Soil Gas	1740	0.01 UF	0.01 UJF	0.01 UF	0.01 UF	0.79 NJF
165'	94384502[b]	Soil	1810	2.0 UF	1.22 NF	0.5 UF	1.0 UF	12.4 NJF
Blank	94384503	Soil Gas	1819	0.01 UF	0.01 UJF	0.01 UF	0.01 UF	0.001 JF
September 23, 1994								
175'	94384334	Soil	0930	2.0 UF	0.5 UF	0.5 UF	1.0 UF	1.32 NF
175'	94384504	Soil Gas	1040	0.02 UF	0.01 UF	0.02 UF	0.01 UF	0.01 UF
185'	94384330	Soil	1400	2.0 UF	0.5 UF	0.5 UF	1.0 UF	1.52 F
185'	94384331	Soil Gas	1625	Loss of packing - could not be analyzed.				
Rinsate	94384332	Water	1830	4.0 UF	1.0 UF	1.0 UF	2.0 UF	1.0 UF
Blank	94384333	Soil Gas	1853	0.04 UF	0.01 UF	0.01 UF	0.02 UF	0.01 UF
September 25, 1994								
195'	94384360	Soil	0830	2.0 UF	0.5 UF	0.5 UF	1.0 UF	26.2 NJF
195'	94394364[c]	Soil	0830	2.0 UF	0.95 NF	0.2 JF	1.0 UF	22.8 NJF
195'	94394364D (duplicate)	Soil	0830	2.0 UF	0.52 NF	0.5 UF	1.0 UF	22.7 NJF
195'	94394361[d]	Water	1020	3.08 NF	0.3 JF	0.2 JF	0.2 JF	44.0 NJF
195'	94394363[de]	Water	1020	6.6 NF	0.8 JF	2.2 NF	2.0 UF	280.0 NJF
September 26, 1994								
215'	94394365	Water	1300	4.0 UF	1.0 UF	1.0 UF	2.0 UF	0.3 JF
215'	94394365D (duplicate)	Water	1300	4.0 UF	1.0 UF	1.0 UF	2.0 UF	1.0 UF
235'	94394366	Water	1605	4.0 UF	1.0 UF	1.0 UF	2.0 UF	1.0 UF

Table 6-5

FIELD ANALYTICAL RESULTS OF SOIL, SOIL GAS, AND WATER SAMPLES - MONITORING WELL MW-1 INSTALLATION
PHASE II FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L for soil gas and water, µg/kg for soil)

Depth (feet BGS)	Sample #	Matrix	Time	Vinyl Cl	1,1-DCE	Trans-1,2-DCE	Cis-1,2-DCE	TCE
235'	94394366D (duplicate)	Water	1605	4.0 UF	1.0 UF	1.0 UF	2.0 UF	1.0 UF
Rinsate	94394367	Water	1730	1.0 U	1.0 UJ	1.0 U	1.0 U	0.24 J
September 27, 1994								
255'	94394369	Water	1905	4.0 UF	1.0 UF	1.0 UF	2.0 UF	2.6 NF
Rinsate	94394370	Water	1310	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U
September 28, 1994								
275'	94394371	Water	1305	4.0 UF	1.0 UF	1.0 UF	2.0 UF	1.0 UF
275'	94394371D (duplicate)	Water	1305	4.0 UF	1.0 UF	1.0 UF	2.0 UF	1.0 UF
295'	94394372	Water	1700	4.0 UF	1.0 UF	1.0 UF	2.0 UF	1.90 JF
September 29, 1994								
295'	94394373	Soil	0746	2.0 UF	0.5 UF	1.2 NF	1.0 UF	0.44 JF
315'	94394374	Water	1705	4.0 UF	1.0 UF	1.0 UF	2.0 UF	1.0 UF
September 30, 1994								
325'	94394375	Water	1355	1.0 UF	1.0 UF	1.0 UF	2.0 UF	1.0 UF
345'	94394376	Water	1815	1.0 UF	1.0 UF	1.0 UF	2.0 UF	1.0 UF
October 2, 1994								
365'	94404420	Water	1450	1.0 UF	1.0 UF	1.0 UF	2.0 UF	1.0 UF
385'	94404421	Water	1750	1.0 UF	1.0 UF	1.0 UF	2.0 UF	1.0 UF
October 3, 1994								
405'	94404422N	Water	1655	1.0 UF	1.0 UF	1.0 UF	2.0 UF	1.0 UF

Table 6-5

FIELD ANALYTICAL RESULTS OF SOIL, SOIL GAS, AND WATER SAMPLES - MONITORING WELL MW-1 INSTALLATION
PHASE II FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L for soil gas and water, µg/kg for soil)

Depth (feet BGS)	Sample #	Matrix	Time	Vinyl Cl	1,1-DCE	Trans-1,2-DCE	Cis-1,2-DCE	TCE
405'	94404422P (duplicate)	Water	1655	1.0 UF	1.0 UF	1.0 UF	2.0 UF	1.0 UF
October 21, 1994								
Blank	94424550	Soil Gas	1709	0.01 UF	0.01 UF	0.01 UF	0.01 UF	0.01 UF
177'	94424551	Soil Gas	1807	0.01 UF	0.01 UF	0.01 UF	0.01 UF	0.01 UF
Trip Blank	94424552	Soil Gas	1830	0.01 UF	0.01 UF	0.01 UF	0.01 UF	0.01 UF

a - Results confirmed at EPA Region 10 laboratory with sample 94384492 (see Table 6-6).
b - Results confirmed at EPA Region 10 laboratory with sample 94384502 (see Table 6-6).
c - Results confirmed at EPA Region 10 laboratory with sample 94394364 (see Table 6-6).
d - Samples were collected during two different sampling attempts.
e - Results confirmed at EPA Region 10 laboratory with sample 94394362 (see Table 6-6).

F - Data was collected using less-rigorous field analytical methods.
J - The associated numerical value is an estimated quantity because the reported concentrations were less than the required detection limits (lowest calibration standard) or quality control criteria were not met.
N - Presumptive evidence of the presence of analyte.
NJ - Presumptive evidence of the material at an estimated quantity.
U - The material was analyzed for but not detected. The associated numerical result is the sample detection limit or instrument detection limit.
µg/kg - Micrograms per kilogram.
µg/L - Micrograms per liter of water.
BGS - Below ground surface.

Table 6-6

ANALYTICAL RESULTS OF SOIL AND GROUNDWATER CONFIRMATION SAMPLES
MONITORING WELL MW-1 INSTALLATION
EPA REGION 10 LABORATORY
PHASE II FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L for water, µg/kg for soil)

Sample #	94384492	94384502	94394364	94394362	94394368
Matrix	Soil	Soil	Soil	Water	Trip Blank Water
Depth	80'	165'	195'	195'	
Analyte					
1,1,1-Trichloroethane	1.6 U	0.45 J	2.0 U	0.66 J	1.0 U
1,1,2-Trichloroethane	1.6 U	2.1 U	2.0 U	0.40 J	1.0 U
1,1-Dichloroethene	1.6 U	0.87 J	2.0 U	1.0 UJ	1.0 UJ
1,2-Dichloroethane	1.6 U	2.1 U	2.0 U	0.54 J	0.43 J
2-Hexanone	3.2 U	2.2 J	4.0 U	1.0 U	1.0 U
4-Methyl-2-Pentanone	1.6 U	3.6	2.0 U	1.0 U	0.12 J
Ethylbenzene	1.6 U	0.13 J	2.0 U	1.0 U	1.0 U
Carbon disulfide	8.0 U	10.3 U	10.0 U	0.93 J	1.0 U
Chloroform	1.8 U	1.9 J	1.6 J	0.60 J	1.0 U
Chloromethane	1.6 U	0.46 J	2.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	1.6 U	2.1 U	2.0 U	0.32 J	1.0 U
Dichlorodifluoromethane	1.2 J	1.9 J	2.0 U	2.0 U	2.0 U
MP-Xylene	3.2 U	0.34 J	4.0 U	2.0 U	NA
Tetrachloroethene	0.70 J	0.96 J	1.5 J	26.7	1.0 U
Toluene	1.6 U	9.7 J	2.0 U	1.0 U	0.38 J
Total Xylenes	3.2 U	0.50 J	4.0 U	2.0 U	2.0 U
trans-1,2-Dichloroethene	1.6 U	0.18 J	2.0 U	1.0 U	1.0 U
Trichloroethene	1.7	25.4	42.9	1510	1.0 U

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected. The associate numerical value is the sample detection limit.
µg/L - Micrograms per liter of water.
µg/kg - Micrograms per kilogram.

Table 6-7

ANALYTICAL RESULTS OF SOIL AND GROUNDWATER SAMPLES - MONITORING WELL MW-2 INSTALLATION
EPA REGION 10 LABORATORY
PHASE II FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE
COEUR D'ALENE, IDAHO
(µg/L for water, µg/kg for soil)

Sample #	94414550	94414551	94414552	94414553	94414554	94414555	94414556
Matrix	Soil	Soil	Soil	Soil	Soil	Water	Trip Blank
Depth (BGS)	20'	80'	165'	198'	199'	198'	–
Analyte							
1,1,1-Trichloroethane	0.39 J	1.0 J	0.65 J	0.49 J	0.44 J	1.0 U	1.0 U
1,1-Dichloroethene	0.21 J	0.86	0.37 J	0.22 J	0.23 J	1.0 U	1.0 U
1,2-Dichloroethane	1.0 U	1.5 U	2.0 U	1.8 U	1.6 U	1.0 U	0.88 J
1,3-Dichlorobenzene	2.3	3.1	3.8	3.2	2.6	1.0 U	1.0 U
2-Hexanone	1.0 U	1.5 U	2.0 U	1.8 U	1.6 U	0.35 J	1.0 U
Chloroform	1.4	1.5 U	2.0 U	1.8 U	1.6 U	1.0 U	1.0 U
Chloromethane	1.0 U	1.5 U	2.0 U	1.8 U	1.6 U	0.098 J	1.0 U
cis-1,3-Dichloropropene	0.039 J	1.6 U	2.1 U	2.0 U	1.7 U	1.1 U	1.1 U
1,1,2,2-Tetrachloroethane	0.43 J	0.54 J	0.78 J	0.54 J	1.6 U	1.0 U	1.0 U
Tetrachloroethene	1.0 U	0.10 J	2.0 U	1.8 U	1.6 U	1.0 U	1.0 U
Dichlorodifluoromethane	0.48 J	12.4	1.8 J	0.45 J	0.48 J	2.0 U	2.0 U
Toluene	1.0 U	1.8	3.7	6.1	12	1.0 U	0.64 J
Total Xylenes	2.0 U	3.1 U	4.0 U	3.6 J	3.2 U	3.0 U	3.0 U
trans-1,2-Dichloroethene	0.35 J	0.53 J	0.52 J	0.46 J	0.46 J	1.0 U	1.0 U
Trichloroethene	0.77 J	1.1 J	7.9	4.7	9.4	79.6	1.0 U

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected at or above the reported result.
BGS - Below ground surface.
µg/L - Micrograms per liter of water.
µg/kg - Micrograms per kilogram.

Table 6-8

ANALYTICAL RESULTS OF GROUNDWATER SAMPLES -
MONITORING WELLS MW-1 AND MW-2
EPA REGION 10 LABORATORY
PHASE III FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	94504420	94504421	94504422	94504423	94504431
Sample Location/Description	MW-1	MW-2	MW-2 Duplicate	Trip Blank (94504420/ 94504421)	Trip Blank (94504422)
Analyte					
Tetrachloroethene	4.7 J	10 U	0.15 J	1.0 U	0.5 U
Trichloroethene	648	160	153	1.0 U	0.5 U
Dichloromethane	20 U	20	5.0 U	2.0 U	5.0 U
1,1,1-Trichloroethane	10 U	10 U	0.12 J	1.0 U	0.5 U
1,1-Dichloroethane	10 U	10 U	0.059 J	1.0 U	0.5 U
1,2-Dichloroethane	10 U	10 U	0.59	0.58 J	0.4 J
2-Pentanone, 4-methyl	10 U	10 U	0.18 J	1.0 U	0.61 J

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected. The associate numerical value is the sample detection limit.

µg/L - Micrograms per liter of water

Table 6-9

ANALYTICAL RESULTS OF OIL AND GROUNDWATER SAMPLES MAGNUSON WELL
EPA REGION 10 LABORATORY
PHASE II AND PHASE III FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(results in µg/kg for oil and µg/L for water)

Sample Number	94424553	94504424	94504441	94504440	94504434
Sample Location/Description	Magnuson Oil	Magnuson Oil	Magnuson Water	Rinsate (945044441)	Trip Blank (94504440, 94504441)
Analyte					
Trichloroethene	248 U	23.3 J	0.05 J	0.5 U	0.5 U
1,2-Dichloroethane	248 U	200 U	0.31 J	0.45 J	1.1
1,2,4-Trichlorobenzene	242 J	257 J	1.0 UJ	1.0 UJ	1.0 UJ
1,2-Dichlorobenzene	323	400 U	0.24 J	1.0 U	1.0 U
Benzene	87.8 J	129 J	0.4 J	0.5 U	0.5 U
Benzene, 1,2,3-trichloro	161 J	400 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Benzene, (1-methylethyl)	139 J	142 J	0.068 J	0.5 U	0.5 U
Benzene, (1-methylpropyl)	335	330 J	1.0 U	1.0 U	1.0 U
Benzene, 1,2,4-trimethyl	5660	7860	1.8	1.0 U	1.0 U
Benzene, 1,2-dimethyl	945	1040	1.0	0.5 U	0.5 U
Benzene, 1,3,5-trimethyl	1560	1680	0.36 J	0.5 U	0.5 U
Benzene, 1-methyl-4-(1-methylethyl)-	486	510	1.0 U	1.0 U	1.0 U
Benzene, ethyl	359	388	0.35 J	0.5 U	0.5 U
Benzene, propyl	502	515	0.17 J	1.0 U	1.0 U
Butylbenzene	1400	1370	2.0 U	1.0 U	1.0 U
Carbon tetrachloride	248 U	200 U	0.5 U	0.033 J	0.5 U
Chloroethane	248 U	200 U	0.5 U	0.13 J	0.5 U
2-Hexanone	248 U	2000 U	3.5 J	3.8 J	0.29 J
MP-xylene	1550	1740	1.3	1.0 U	1.0 U
Naphthalene	9500 J	3,100 J	8.6 J	5.0 UJ	5.0 UJ
2-Pentanone, 4-methyl	248 U	2000 U	1.8 J	2.0 J	1.4 J
2-Propanone	445 U	2000 U	123 J	69.9 J	5.0 U
Toluene	2810	3150	6.5	0.5 U	0.5 U
Total xylenes	2490	2780	2.3	1.0 U	1.0 U

J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected at or above the reported result.
UJ - The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.
µg/L - Micrograms per liter of water.

Table 6-10

PCB ANALYTICAL RESULTS OF OIL SAMPLES MAGNUSON WELL
EPA REGION 10 LABORATORY
PHASE II AND PHASE III FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/g)

Sample Number	94424553	94504425
Analyte		
PCB-1242	25.3	18
PCB-1254	13	6.6
PCB-1260	2.9 J	3.6

J - The analyte was positively identified. The associated numerical result is an estimate.
µg/g - Micrograms per gram of oil.

Table 6-11

ANALYTICAL RESULTS OF VAPOR SAMPLES - MW-1 WELLHEAD
EPA REGION 10 LABORATORY
PHASE III FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	94504426	94504427	94504428	94504429	94504430
Time Interval of Sample Collection/Description	10:30 - 11:30	14:30 - 15:30	18:30 - 19:30	21:00 - 22:00	Trip Blank
Analyte					
Trichloroethene	12 J	7.4 J	15.8 J	0.016 J	0.0025 UJ
1,1,1-Trichloroethane	0.0096 J	0.007 J	0.013 J	0.0025 UJ	O.0025 UJ
2-Propanone	1.4 J	0.98 J	1.3 J	0.012 UJ	0.026 J
Benzene	0.013 J	0.009 J	0.022 J	0.0025 UJ	0.0025 UJ
Benzene, 1,2,4-trimethyl	0.0073 J	0.0029 J	0.0052 J	0.0025 UJ	0.0025 UJ
Benzene, 1,2-dimethyl	0.0087 J	0.0037 J	0.0043 J	0.0025 UJ	0.001 J
Benzene, ethenyl	0.0078 J	0.003 J	0.003 J	0.0025 UJ	0.0025 UJ
Benzene, ethyl	0.0072 J	0.0032 J	0.0033 J	0.0025 UJ	0.0025 UJ
Carbon Disulfide	0.014 J	0.0092 J	0.026 J	0.0025 UJ	0.0025 UJ
Chloromethane	0.033 J	0.037 J	0.044 J	0.005 UJ	0.005 UJ
Tetrachloroethene	0.97 J	0.54 J	1.6 J	0.0025 UJ	0.0025 UJ
Dichloromethane	0.03 J	0.022 J	0.067 J	0.0025 UJ	0.0025 UJ
MP-xylene	0.032 J	NA	NA	NA	NA
Toluene	0.024 J	0.0088 J	0.011 J	0.0025 UJ	0.0011 J
Total Xylenes	0.041 J	0.016 J	0.016 J	0.005 UJ	0.0028 J
Trichlorofluoromethane	0.0041 J	0.003 J	0.0064 J	0.0025 UJ	0.0025 UJ

NA - Analysis not reported.
J - The analyte was positively identified. The associated numerical result is an estimate.
U - The analyte was not detected at or above the reported result.
UJ - The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.
µg/L - Micrograms per liter of water

Table 6-12

INORGANIC ANALYTICAL RESULTS OF GROUNDWATER SAMPLES - MW-1 AND MW-2
EPA REGION 10 LABORATORY
PHASE III FIELD ACTIVITIES
COEUR D'ALENE GROUNDWATER CONTAMINATION SITE ESI
COEUR D'ALENE, IDAHO
(µg/L)

Sample Number	94514610	94514610	94514611
Sample Location/Description	MW-1	MW-1 Laboratory Duplicate	MW-2
Analyte			
Aluminum	89 P	86 P	197
Antimony	40 U	40 U	40 U
Arsenic	35.6	34.7	3.4 P
Barium	22.7	22.7	23.6
Beryllium	0.50 U	0.50 U	0.50 U
Cadmium	2.0 U	2.0 U	2.0 U
Calcium	52,100	52,300	50,500
Chromium	5.0 U	5.9 P	5.0 U
Cobalt	10 U	10 U	10 U
Copper	3.0 U	3.0 U	5.1 P
Iron	25.8	28.6	84.4
Lead	0.5 U	0.54 PB	18.3
Magnesium	40,400	40,400	41,400
Manganese	3.0 PB	2.6 PB	22.1
Mercury	0.20 U	NA	0.20 U
Nickel	10 U	10 U	10 U
Potassium	2810	2920	4890
Silver	3.0 U	3.0 U	3.0 U
Selenium	2.0 U	2.0 U	2.0 U
Sodium	11,300	11,300	10,300
Thallium	1.0 U	1.0 U	1.0 U
Vanadium	3.0 U	3.0 U	3.0 U
Zinc	4.0 U	4.0 U	4.0 U

B - Analyte is found in the analytical blank as well as in the sample indicating possible/probable blank contamination. If analytes are found in any of the associated procedural blanks the concentration in the samples must be at least ten times the quantity observed in the blank. If the sample result fails these criteria the sample result is qualified (B).

P - The analyte was detected above the Instrument Detection Limit, but not quantified within the expected limits of precision. The laboratory has established maximum quantitation limits having a relative standard deviation of no more than 10 %.

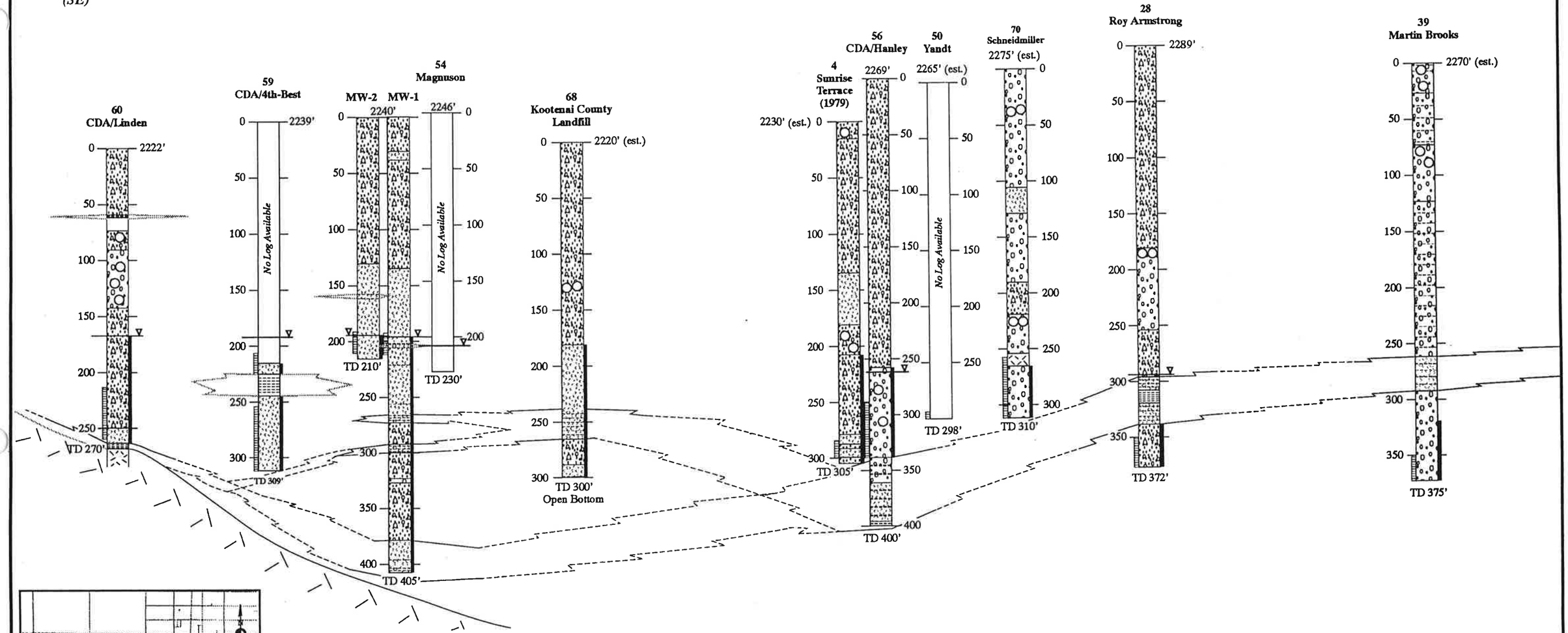
U - The analyte was not detected at or above the reported result.

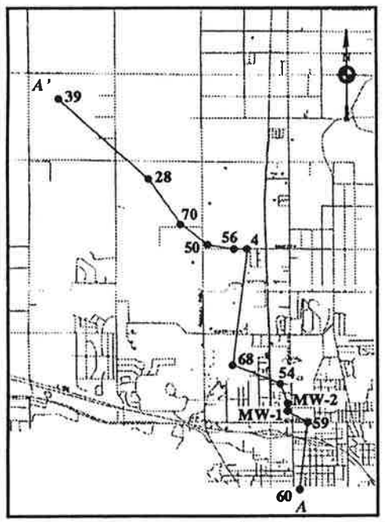
NA - No analysis reported.

µg/L - Micrograms per liter of water.

A
(SE)

A'
(NW)





LEGEND

	Boulder		Screened/Perforated Interval
	Gravel	TD	Total Depth Drilled
	Sand		SWL (12-16-94)
	Sand and Gravel		Saturated Interval (During Drilling)
	Clay Seam		Possible Correlation of Clay-Bearing Intervals
	Clay		
	Basalt		Vertical Exaggeration: 24X

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Figure 6-1
GEOLOGIC CROSS-SECTION A - A'

COEUR D'ALENE GROUNDWATER CONTAMINATION SITE
Coeur d'Alene, Idaho

DRAWN BY:	DATE:	JOB NO:	DWG NO:
AES	7-10-95	ZO3055	2127FG.CDR

B
(SW)

106
U.S.F.S. New Irrigation

5
Townsend

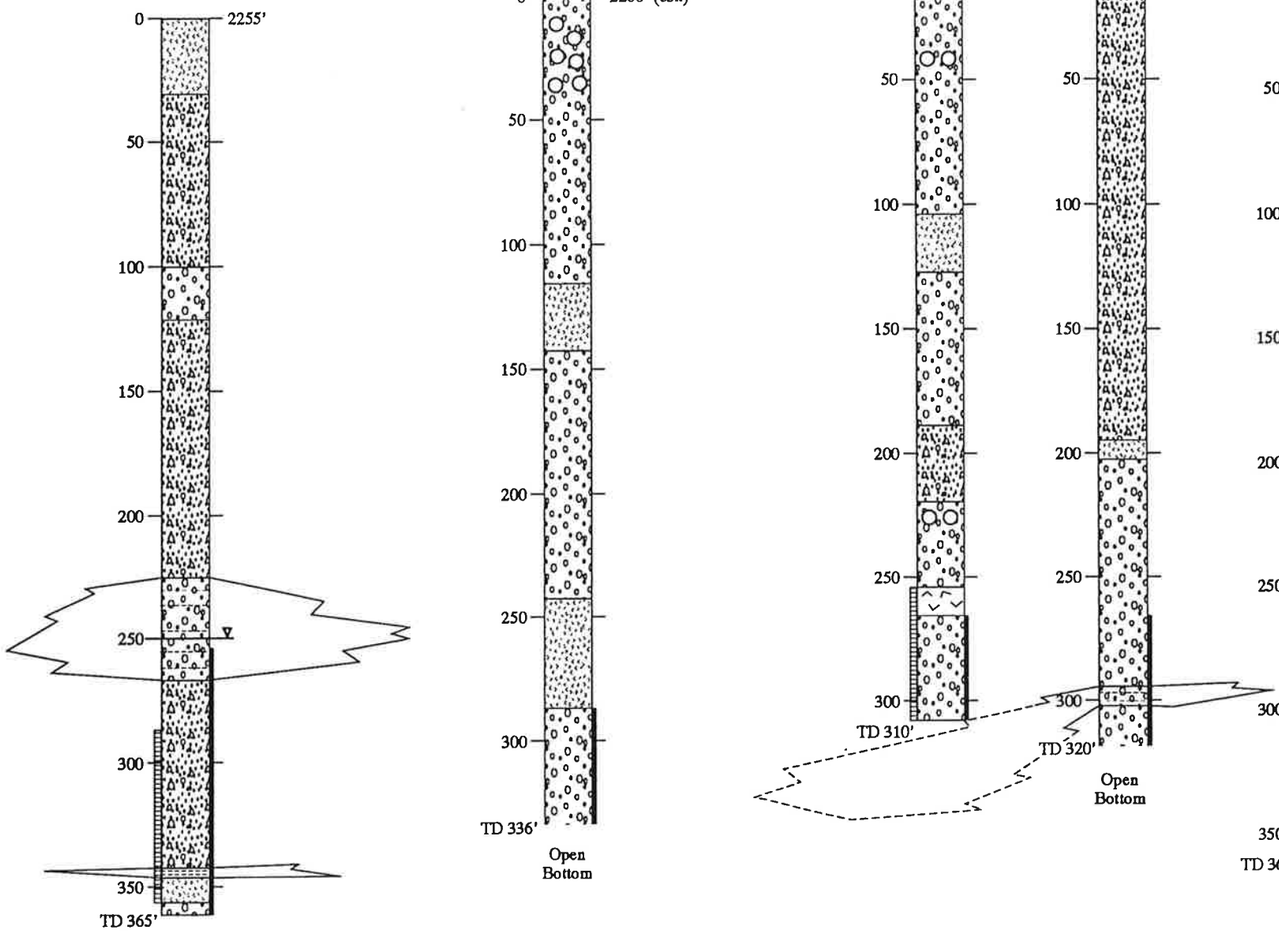
70
Schneidmiller

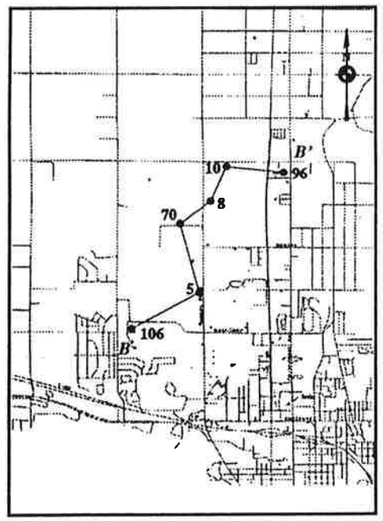
8
Dr. Jones
(Formerly A. Eborall)

10
Prairie Animal Hospital
(Formerly O.M. Builders)

96
Steve Meyer/AID
(Formerly Betty Luttel)

B'
(NE)





LEGEND

	Boulder		Screened/Perforated Interval
	Gravel	TD	Total Depth Drilled
	Sand	▽	SWL (12-16-94)
	Sand and Gravel		Saturated Interval (During Drilling)
	Clay Seam		Possible Correlation of Clay-Bearing Intervals
	Clay		Vertical Exaggeration: 24:1
	Basalt		

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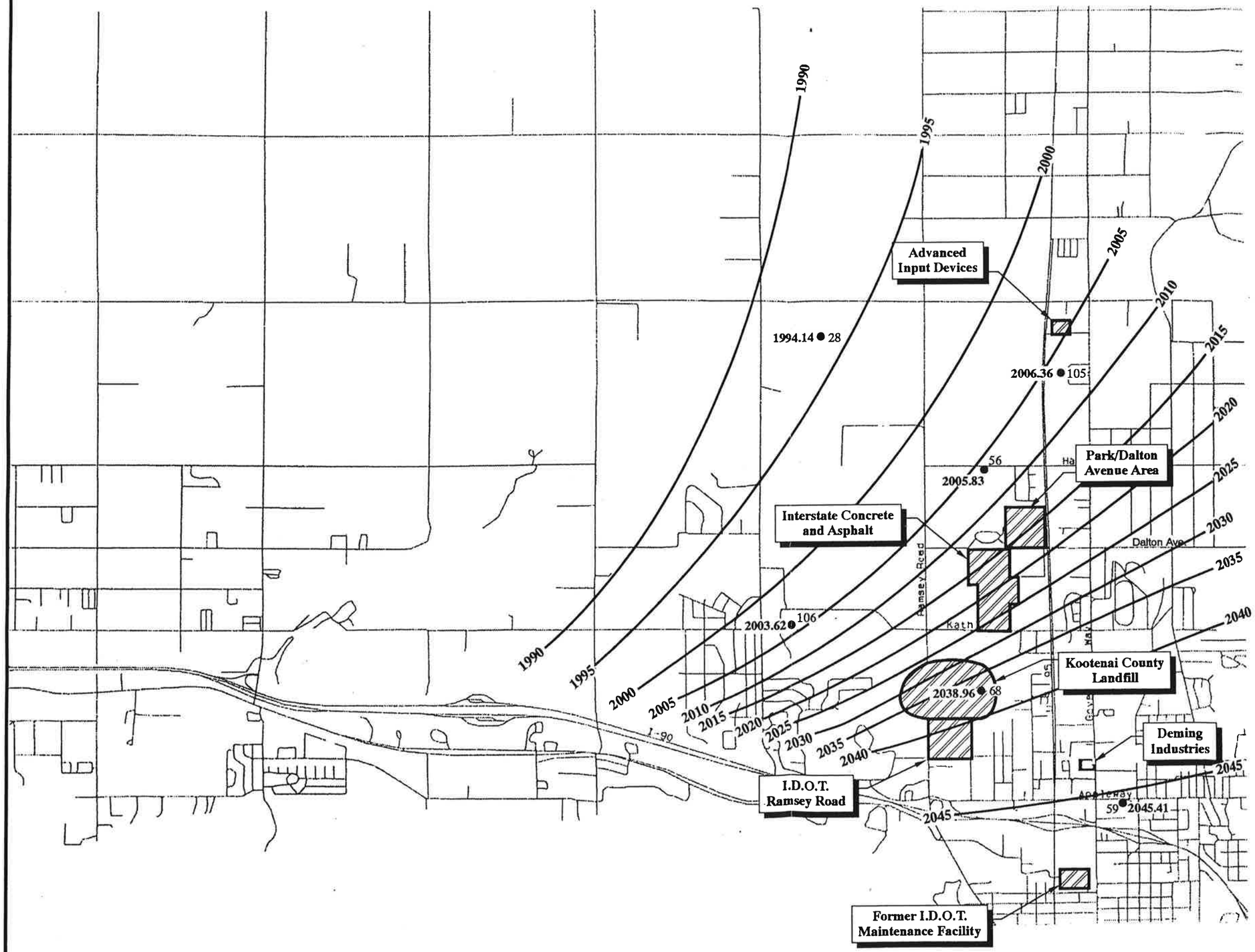
Figure 6-2
GEOLOGIC CROSS-SECTION B - B'

COEUR D'ALENE GROUNDWATER CONTAMINATION SITE
Coeur d'Alene, Idaho

DRAWN BY:	DATE:	JOB NO:	DWG NO:
AES	7-10-95	ZO3055	2130FG.CDR



LEGEND

- ● Domestic/Municipal Wells
- **2005.83** Water Elevations (Elevation Above Sea Level) Measured June 14, 1994
- Potential Source Areas Investigated During Phase I Fieldwork

N

0 1000 2000 3000 4000

Approximate Scale in Feet

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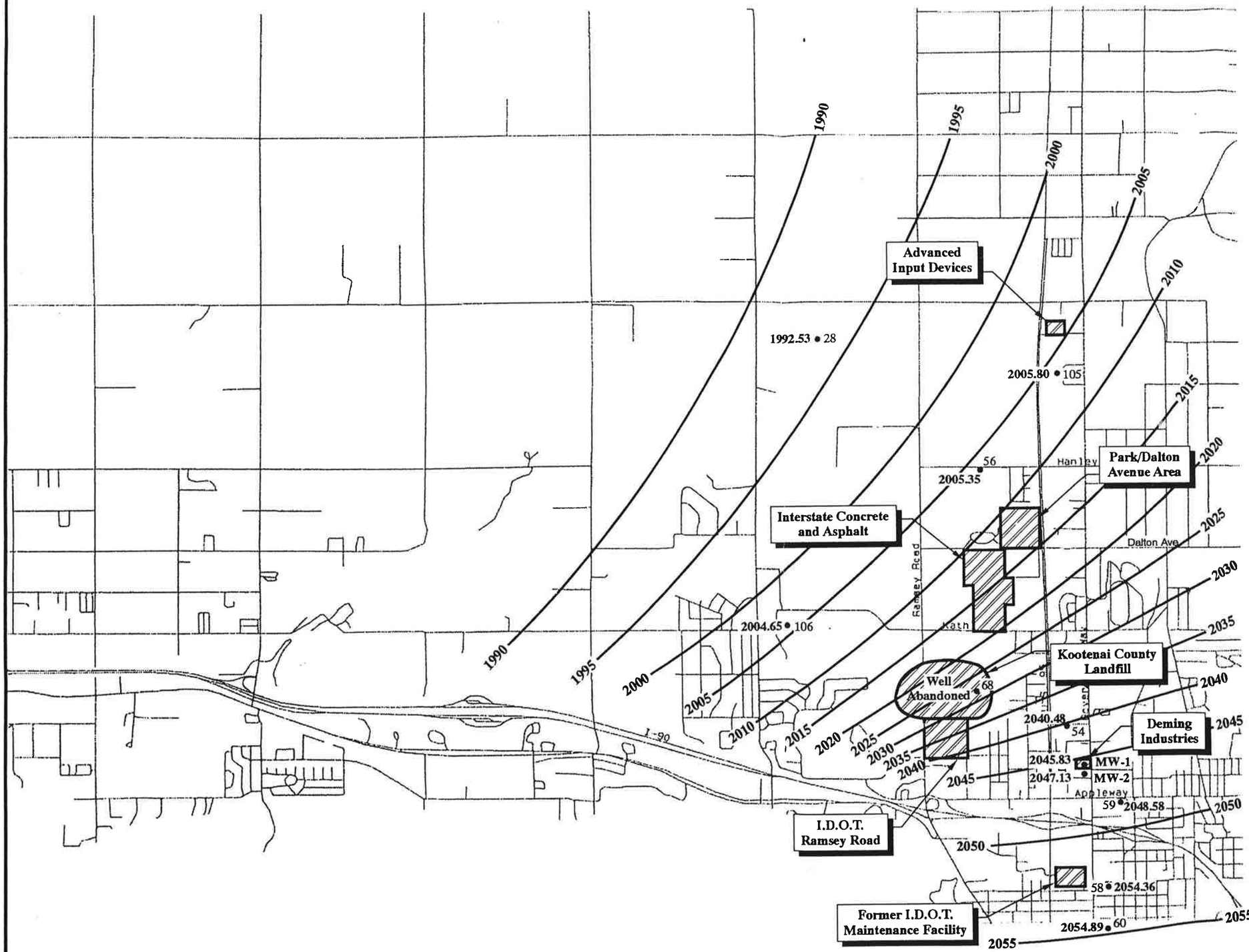
Figure 6-3
GROUNDWATER CONTOUR MAP
(June 14, 1994)

COEUR D'ALENE GROUNDWATER CONTAMINATION SITE
Coeur d'Alene, Idaho

DRAWN BY:	DATE:	JOB NO:	DWG NO:
GIS	7-12-95	ZO3055	2121FG.CDR



LEGEND

- • Domestic/Municipal/ Monitoring Wells
- **2005.35** Water Elevations (Elevation Above Sea Level) Measured December 16, 1994
- Potential Source Areas Investigated During Phase I Fieldwork

N

0 1000 2000 3000 4000

Approximate Scale in Feet

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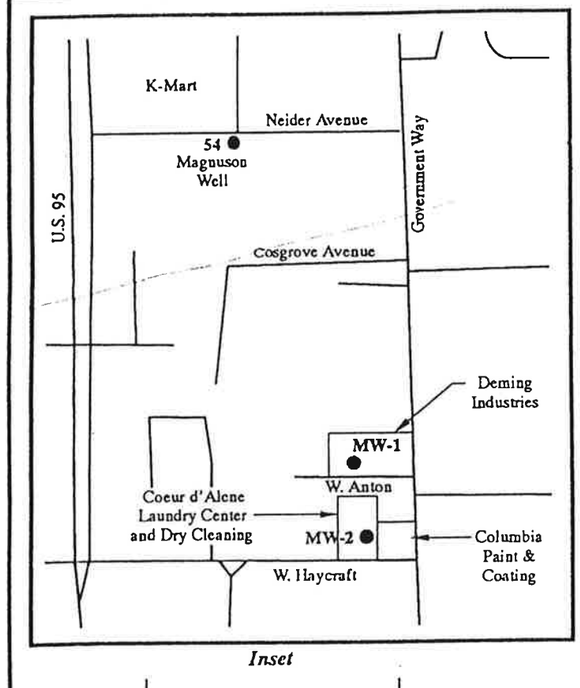
Figure 6-4
GROUNDWATER CONTOUR MAP
(December 16, 1994)

COEUR D'ALENE GROUNDWATER CONTAMINATION SITE
Coeur d'Alene, Idaho

DRAWN BY:	DATE:	JOB NO:	DWG NO:
GIS	7-12-95	ZO3055	2120FG.CDR



Inset

LEGEND

- ● Domestic Wells
- ▲ Municipal Wells
- ■ Monitoring Well

N

0 1000 2000 3000 4000

Approximate Scale in Feet

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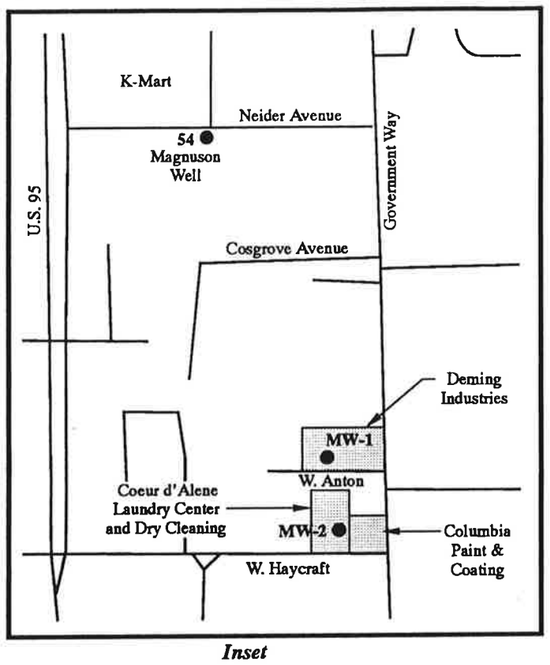
Figure 6-5
DOMESTIC, MUNICIPAL, AND MONITORING WELLS SAMPLED DURING ESI

COEUR D'ALENE GROUNDWATER CONTAMINATION SITE
Coeur d'Alene, Idaho

DRAWN BY:	DATE:	JOB NO:	DWG NO:
GIS	3-21-95	ZO3055	2133FG.CDR



Inset

LA Aluminum

	1985	1989
TCE	*1.0* *	*2.0*
1,1-DCE	—	—
c-1,2-DCE	—	—
t-1,2-DCE	—	—

CDA Airport

	1985
TCE	*0.4* *
1,1-DCE	—
c-1,2-DCE	—
t-1,2-DCE	—

Steve Meyer/A.I.D.

	6/94 Field	6/94 Laboratory	12/94
TCE	*0.8 JF,*	1.0 U	0.5 U
1,1-DCE	1.0 UF	1.0 U	0.5 U
c-1,2-DCE	1.0 UF	1.0 U	0.5 U
t-1,2-DCE	1.0 UF	1.0 U	0.5 U

Schneidmiller

	6/94 Field	6/94 Laboratory
TCE	*2.6 JF,*	*0.13 J*
1,1-DCE	1.0 UF	1.0 U
c-1,2-DCE	1.0 UF	1.0 U
t-1,2-DCE	1.0 UF	1.0 U

CDA/Hanley

	1992 - Present	12/94
TCE	*up to 5.22*	*2.6*
1,1-DCE	—	0.5 U
c-1,2-DCE	—	0.5 U
t-1,2-DCE	—	0.5 U

Robert Yandt

	6/94 Field	6/94 Laboratory	12/94
TCE	*0.4 JF,*	1.0 U	0.5 U
1,1-DCE	1.0 UF	1.0 U	0.5 U
c-1,2-DCE	1.0 UF	1.0 U	0.5 U
t-1,2-DCE	1.0 UF	1.0 U	0.5 U

Sunrise Terrace Wells

	1990-91	6/94	12/94 North	12/94 South
TCE	*up to 26.5*	*13.4*	*10.5 J*	*6.6*
1,1-DCE	—	1.0 U	0.5 U	0.5 U
c-1,2-DCE	—	1.0 U	0.5 U	0.5 U
t-1,2-DCE	—	1.0 U	0.5 U	0.5 U

USFS Domestic

	1985	6/94
TCE	*0.4* *	1 UF
1,1-DCE	—	1 UF
c-1,2-DCE	—	1 UF
t-1,2-DCE	—	1 UF

Magnuson

	12/94
TCE	*0.05 J*
1,1-DCE	0.5 U
c-1,2-DCE	0.5 U
t-1,2-DCE	0.5 U

Turrel

	1985	1989	6/94
TCE	*1.0* *	*2.0*	1 UF
1,1-DCE	—	—	1 UF
c-1,2-DCE	—	—	1 UF
t-1,2-DCE	—	—	1 UF

MW-1

	9/94	12/94
TCE	*1,510*	*648*
1,1-DCE	1.0 UJ	20 U
c-1,2-DCE	*0.32 J*	10 U
t-1,2-DCE	1.0 U	10 U

H & D Trailer Park

	4/94	6/94
TCE	*0.68*	2 UF
1,1-DCE	—	2 UF
c-1,2-DCE	—	10 UF
t-1,2-DCE	—	10 UF

MW-2

	10/94	12/94
TCE	*79.6*	*160*
1,1-DCE	1.0 U	20 U
c-1,2-DCE	1.0 U	10 U
t-1,2-DCE	1.0 U	10 U

CDA/Locust

	1989	12/94
TCE	*0.6*	0.5 U
1,1-DCE	—	0.5 U
c-1,2-DCE	—	0.5 U
t-1,2-DCE	—	0.5 U

CDA/Linden

	1989
TCE	*2.0*
1,1-DCE	—
c-1,2-DCE	—
t-1,2-DCE	—

LEGEND

- ● Domestic Wells
- ▲ Municipal Wells
- ■ Monitoring Well

* Reported TCE analytical results for water samples analyzed prior to 1989 are of questionable quality due to inadequate quality assurance procedures in place at the analytical laboratory at that time.

Analytical Results in ug/L

Refer to Tables 6-2 through 6-4 and 6-6 through 6-8 for Explanation of Data Qualifers

Note: Analytical results are presented only for samples in which TCE was detected, except for samples collected in 6/94 which were analyzed at both the field and fixed laboratories.

N

0 1000 2000 3000 4000

Approximate Scale in Feet

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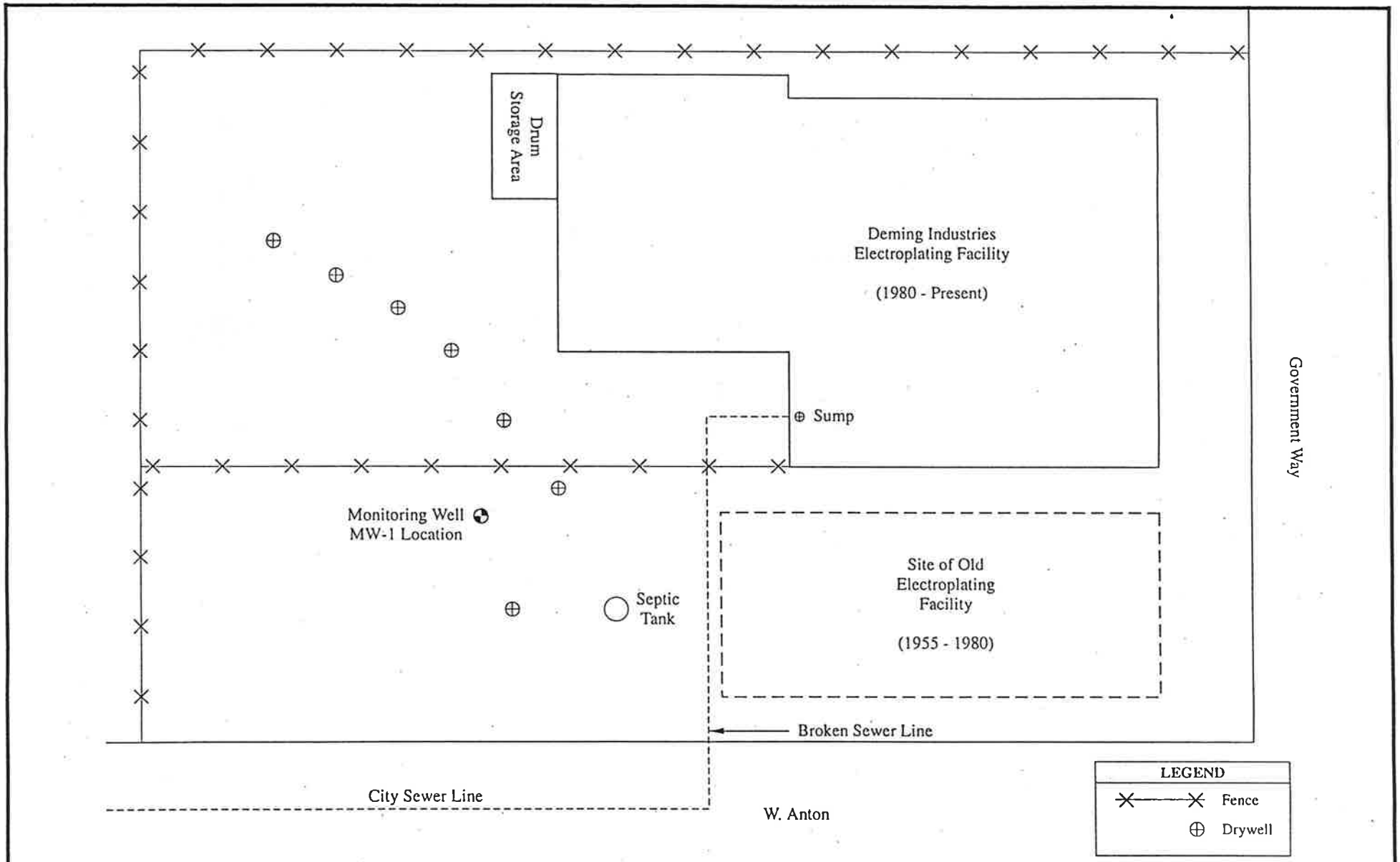
Figure 6-6
SUMMARY TO DATE OF ANALYTICAL RESULTS OF GROUNDWATER SAMPLES IN WHICH TCE WAS DETECTED

COEUR D'ALENE GROUNDWATER CONTAMINATION SITE
Coeur d'Alene, Idaho

DRAWN BY:	DATE:	JOB NO:	DWG NO:
GIS	3-27-95	ZO3055	2134FG.CDR



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Seattle, Washington

COEUR D'ALENE GROUNDWATER ESI
Coeur d'Alene, Idaho

0 15' 30'
Approximate Scale In Feet

Figure 6-7
MW-1 LOCATION MAP
DEMING INDUSTRIES

Drawn By:	Date	TDD/Job No.	Dwg. No.
AES	11-14-94	ZO3901	1941SM

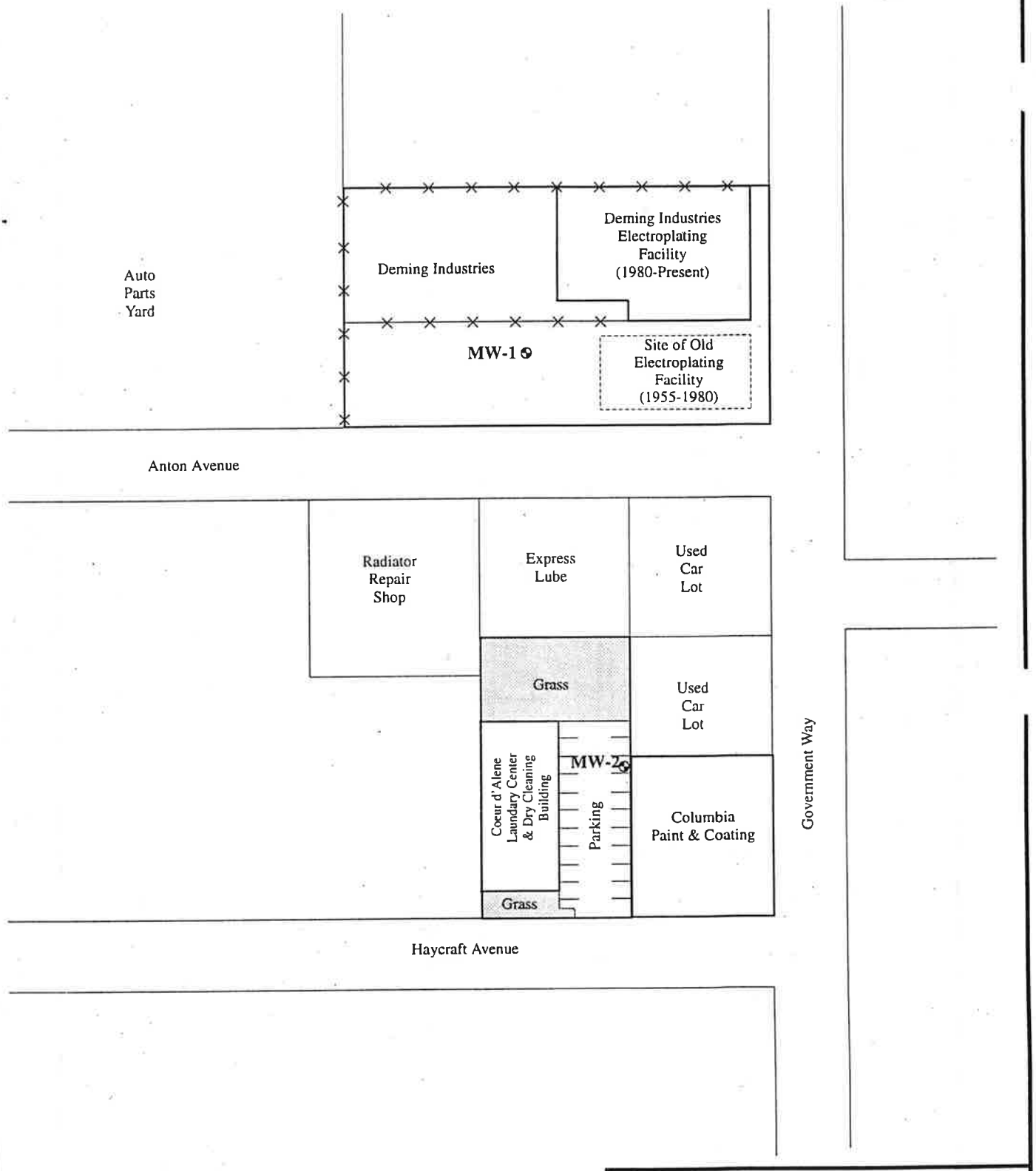

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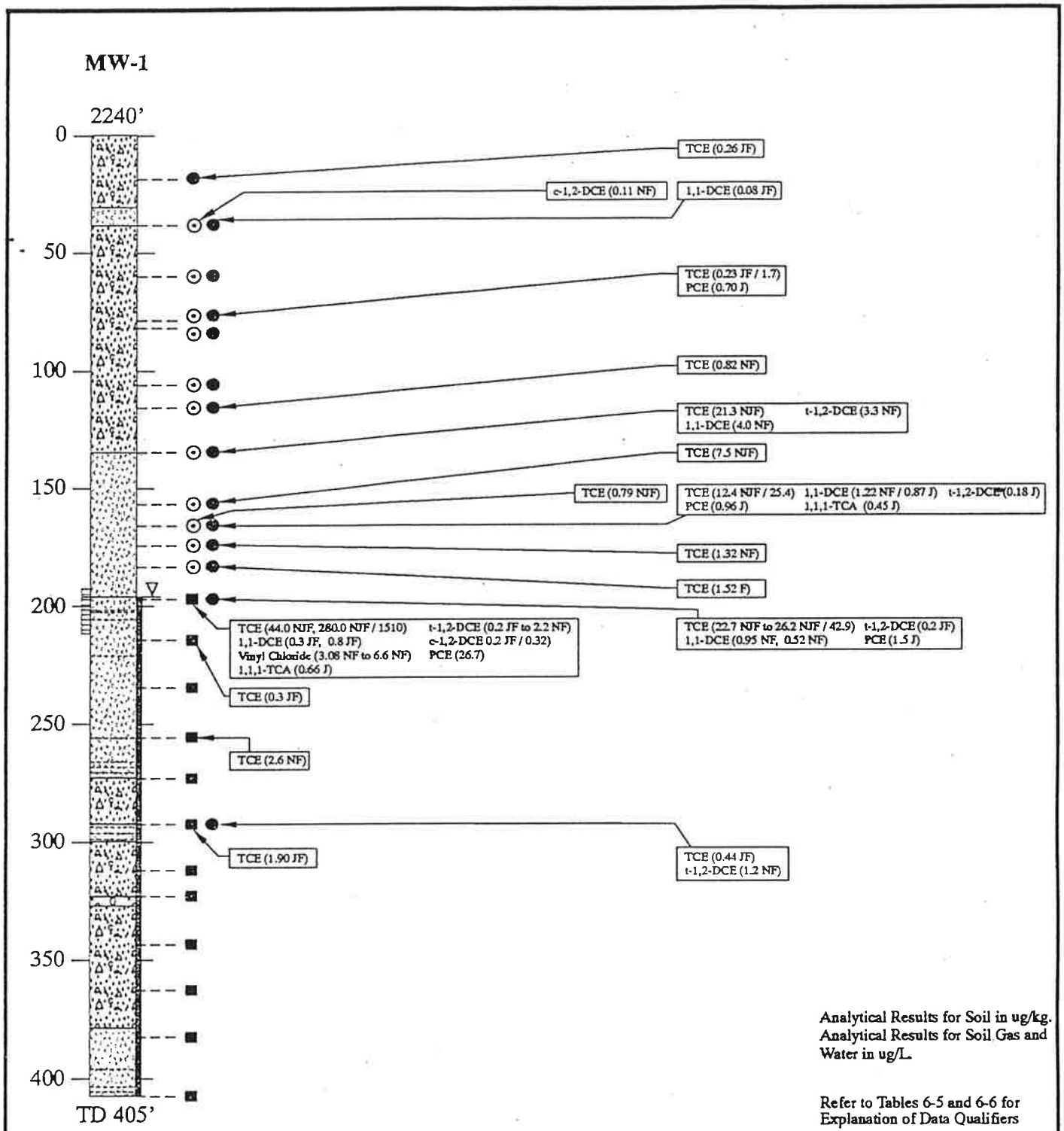
Figure 6-8
SITE MAP
MW-1/MW-2 AREA

Coeur d'Alene Groundwater Contamination ESI
Coeur d'Alene, Idaho

DRAWN BY:	DATE:	JOB NO:	DWG NO:
AS	7-13-95	ZQ3055	2190FG

recycled paper



Analytical Results for Soil in ug/kg.
Analytical Results for Soil Gas and Water in ug/L.

Refer to Tables 6-5 and 6-6 for Explanation of Data Qualifiers

LEGEND

- Gravel
- Sand
- Sand and Gravel
- Clay Seam
- Screened/Perforated Interval
- TD Total Depth Drilled
- SWL (12-16-94)
- Saturated Interval (During Drilling)
- Groundwater Sample
- Soil Gas Sample
- Soil Sample

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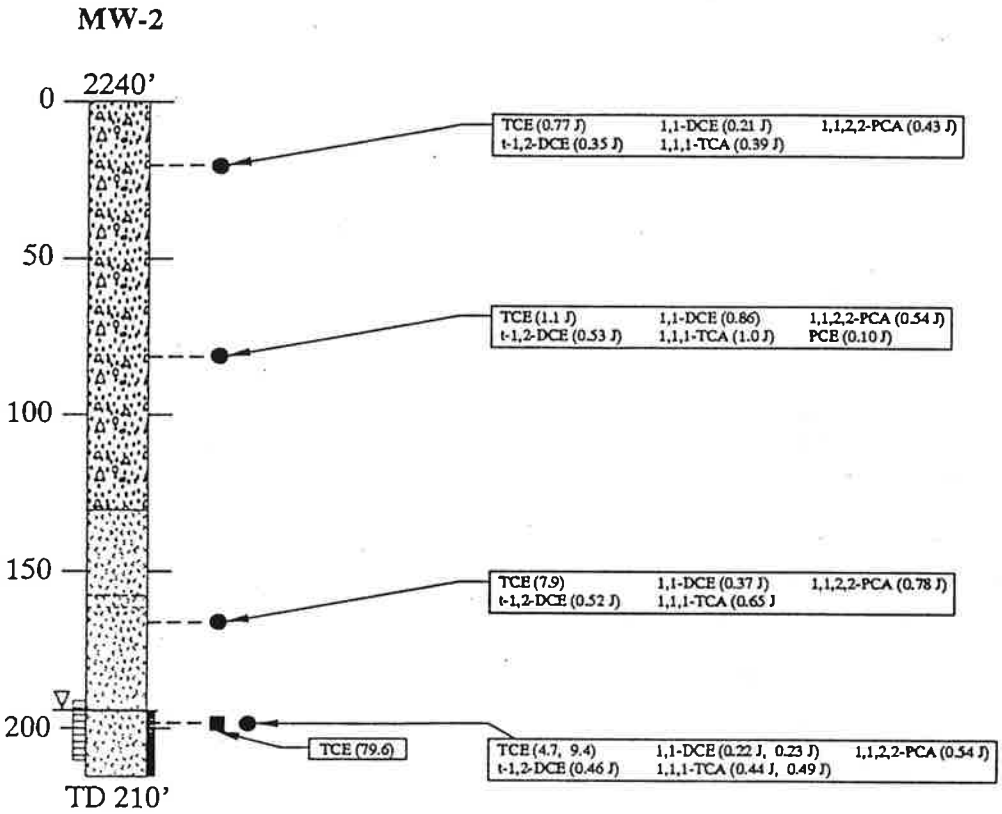
Figure 6-9
ANALYTICAL RESULTS FOR TCE TRANSFORMATION SERIES OF SAMPLES COLLECTED DURING MW-1 INSTALLATION

COEUR D'ALENE GROUNDWATER CONTAMINATION SITE
Coeur d'Alene, Idaho

DRAWN BY:	DATE:	JOB NO:	DWG NO:
AES	7-10-95	ZO3055	2137FG.CDR



Analytical Results for Soil in ug/kg.
Analytical Results for Soil Gas and Water in ug/L.

Refer to Table 6-7 for Explanation of Data Qualifiers

LEGEND

- Sand
- Sand and Gravel
- Clay Seam
- Screened/Perforated Interval
- TD Total Depth Drilled
- SWL (12-16-94)
- Saturated Interval (During Drilling)
- Groundwater Sample
- Soil Sample

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Figure 6-10
ANALYTICAL RESULTS FOR TCE TRANSFORMATION SERIES OF SAMPLES COLLECTED DURING MW-2 INSTALLATION

COEUR D'ALENE GROUNDWATER CONTAMINATION SITE
Coeur d'Alene, Idaho

DRAWN BY:	DATE:	JOB NO:	DWG NO:
AES	7-10-95	2O3055	2137FG.CDR

7. SUMMARY AND CONCLUSIONS

Contaminants of primary concern for the Couer d'Alene Groundwater investigation were TCE and related breakdown components. Other compounds detected (e.g., timethylbenzene) and presented in this report are not discussed in terms of potential waste stream sources, unless the compounds were detected consistently in media samples or the compounds could be associated with known facility processes.

TCE was detected in confirmation samples collected at the following potential source locations investigated during Phase I field activities: Deming Industries (soil and soil gas); Advanced Input Devices (AID) (soil gas); the current IDOT maintenance facility on Ramsey Road (soil gas); and the Kootenai County Landfill on Ramsey Road (soil gas). PCE, which breaks down into TCE, was also detected in confirmation samples collected at the following potential source areas investigated during Phase I field activities: Deming Industries (soil and soil gas); AID (soil gas); the former IDOT maintenance facility (soil gas); the current IDOT maintenance facility (soil gas); and the Kootenai County Landfill on Ramsey Road (soil gas). PCE was also detected in a confirmation soil gas sample collected from the Ramsey Road right of way adjacent to the current IDOT maintenance facility.

Selection of confirmation sampling locations during Phase I field activities was based principally upon analytical results of soil gas samples collected by ESAT and analyzed by ESAT (FASP).

NOTE: PROBLEMS WITH PROCEDURES USED TO COLLECT AND ANALYZE THE SOIL GAS SAMPLES DURING PHASE I FIELD ACTIVITIES HAVE BEEN IDENTIFIED (APPENDIX A). PROBLEMS PERTAIN TO

BOTH FIELD AND CONFIRMATION SOIL GAS SAMPLES COLLECTED BY ESAT AND ANALYZED AT BOTH THE ESAT FIELD LABORATORY (FASP) AND EPA REGION 10 LABORATORY DURING PHASE I FIELD ACTIVITIES. BASED UPON THESE PROBLEMS, IT HAS BEEN DETERMINED THAT THE PHASE I SOIL GAS ANALYTICAL RESULTS ARE NOT VALID. AT THE REQUEST OF EPA, THE PHASE I FASP SOIL GAS RESULTS ARE INCLUDED IN THIS REPORT FOR INFORMATIONAL PURPOSES. AVAILABLE INFORMATION SUGGESTS THAT THE CONFIRMATION SOIL GAS SAMPLE RESULTS PRESENTED HEREIN ARE BIASED LOW (APPENDIX A).

Concentrations of TCE and PCE were very low in all of the aforementioned samples except those collected at Deming Industries. On the basis of the Phase I data and historical evidence, it appeared likely that Deming Industries is a source of TCE detected in area groundwater. It is noted, however, that the other potential source areas investigated, and other possible sources not yet identified, could also be sources of TCE in area groundwater.

On the basis of the historical and Phase I data discussed above, a monitoring well was installed adjacent to the former drainfield at Deming Industries during Phase II field activities. Soil and soil gas samples collected during drilling of MW-1 appear to trace the migration of TCE and PCE from the surface to the water table (encountered at approximately 195 feet BGS). TCE and PCE were detected at relatively high concentrations (up to 1510 μg/L and 26.7 μg/L, respectively) in groundwater samples collected at the water table during drilling. TCE was also detected in deeper groundwater samples and one soil sample collected during drilling from depths up to 295 feet BGS. Neither TCE nor its breakdown products were detected in groundwater samples collected from 295 to 405 feet BGS, the total depth drilled. Monitoring well MW-1 was installed with a screen set at an interval straddling the water table. TCE and PCE were detected in a groundwater sample collected from MW-1 at concentrations of 648 μg/L and 4.8 μg/L (estimated), respectively.

A second monitoring well (MW-2) was installed at a location approximately 265 feet south and hydraulically upgradient of MW-1 in the parking lot between the facilities of Coeur

d'Alene Laundry Center and Dry Cleaning and Columbia Paint and Coating. Soil samples collected during drilling through the unsaturated zone contained TCE and PCE, as well as TCA and PCA. Soil and groundwater samples collected from near the water table (encountered at approximately the same depth as in MW-1) contained TCE at up to 9.4 μg/L and 79.6 μg/L, respectively. Drilling was discontinued at a depth of 215 feet and monitoring well MW-2 was installed in a manner identical to that of MW-1, with a screened interval straddling the water table. A groundwater sample collected from MW-2 contained TCE at a concentration of 153 μg/L. The sample also contained low concentrations of PCE, 1,1-DCE, and TCA.

The TCE, PCE, TCA, and PCA detected in the soil and/or groundwater samples collected during and after drilling of MW-2 are of uncertain origin. One possible source of these compounds is an existing or historic source in the immediate vicinity of the monitoring well. MW-2 is located on one of the 26 potential sources of TCE identified during EPA's initial investigations of the site (Table 2-2). The Coeur d'Alene Laundry Center and Dry Cleaning facility was identified as a potential source of TCE because it engages in dry cleaning, a process in which TCE has commonly been used. Based upon an interview with the Mr. Wardian, a visual inspection of the dry cleaning facility, and a discussion with IDEQ, TCE was not determined to have been used at the site in the past, and no sumps, underground storage tanks, or drainfields are believed to exist on site. However, several drums of PCE were noted during the FIT site visit in 1991, and PCE is reported by Mr. Wardian to still be used. Other industries also are present nearby, most notably a paint shop (Columbia Paint and Coating), located immediately east of Coeur d'Alene Laundry Center and Dry Cleaning. No information on Columbia Paint and Coating regarding past hazardous waste violations were available from IDEQ.

Another possible explanation for TCE, PCE, and TCA in MW-2 soil and groundwater samples is lateral migration southward from Deming Industries. Such lateral migration could be the result of dispersion of the plume as it migrates downward through the unsaturated zone, ponding on localized thin clay layers (e.g., as noted during drilling of MW-2 between 156 and 160 feet BGS), or possible manmade conduits (e.g., underground utilities lines). The TCE detected in the deep subsurface soil could be the result of volatilization of TCE off of

the water table. The high concentration of TCE in groundwater in MW-2 could be attributable to a localized reversal of the northward hydraulic gradient in the area of MW-1 and MW-2, allowing the southward migration of groundwater contaminated with TCE from Deming Industries. Based upon preliminary groundwater movement modeling, such a reversal of hydraulic gradient could be caused by high pumping rates of several municipal wells located to the southeast and south of MW-1 and MW-2 (Fuentes 1994). Water level measurements collected after well installation (October 18 through 20, 1994) and on December 16, 1994, indicate that groundwater was toward the north at those times.

Another possible source of TCE in groundwater detected in MW-2, as well as MW-1 and other wells to the north, is a TCE source located upgradient of MW-2.

Groundwater sampling from several existing domestic and municipal wells within the CDA study area resulted in the confirmation of TCE in samples from five wells: the Sunrise Terrace Well System (consisting of two wells), the Coeur d'Alene Hanley Well, the Schneidmiller well, and the Magnuson well. Of these wells, only the Hanley Well is currently being used as a source of drinking water. The City of Coeur d'Alene has sampled the Hanley well and the other municipal supply wells on a quarterly basis to monitor TCE concentrations. Until May 1995, TCE had not been detected in the Hanley well samples above the MCL of 5 μg/L. Following the detection of TCE in a Hanley water sample at 5.22 μg/L in May 1995, the City of Coeur d'Alene reported plans to: initiate bi-monthly sampling for TCE of the Hanley well; minimize pumping of the well over the summer months; if possible, replace the well with an alternate for the fall and winter; locate potential new water sources. The Sunrise Terrace Well System is not currently in use. However, the land is in the process of being sold and future groundwater use is not known. It cannot be definitely assured that it will not be used as a source of drinking water in the future. The Schneidmiller well is currently used for irrigation of a grass crop used for production of grass seed. It appears unlikely that TCE from this well is affecting public health via drinking water or via ingestion of the grass crop. However, the public may be exposed to very low concentrations of TCE via inhalation of TCE volatilized during irrigation of the crop. The Magnuson well is presently unused. The pump was removed during the present investigation.

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